

ตารางที่ 1 แสดงค่าพลังงานยึดเหนี่ยวและพลังงานยึดเหนี่ยวต่อนิวคลีออนสำหรับนิวไคลด์ต่าง ๆ

นิวไคลด์	A	Z	$N = A - Z$	มวล	พลังงานยึดเหนี่ยว (เมกอีวี)	พลังงานยึดเหนี่ยว ต่อนิวคลีออน
He	4	2	2	4.0026036	28.2967	7.07
Li	7	3	4	7.016005	39.2461	5.61
Be	9	4	5	9.012186	58.1645	6.46
B	11	5	6	11.0093051	76.2088	6.93
C	12	6	6	12.000000	92.1654	7.68
N	14	7	7	14.0030744	104.6633	7.48
O	16	8	8	15.9949149	127.6248	7.98
F	19	9	10	18.998405	147.8057	7.78
Ne	20	10	10	19.9924404	160.6520	8.03
Na	23	11	12	22.989773	186.5682	8.11
Mg	24	12	12	23.985045	198.2613	8.26
Al	27	13	14	26.981535	224.9637	8.33
Si	28	14	14	27.976927	236.5451	8.45
P	31	15	16	30.973763	262.9261	8.48
S	32	16	16	31.972074	271.7884	8.49
Cl	35	17	18	34.968854	298.2206	8.52
Ar	40	18	22	39.962384	343.8231	8.60
K	39	19	20	38.963714	333.7303	8.56
Ca	40	20	20	39.962589	342.0682	8.55
Sc	45	21	24	44.955919	387.8570	8.62
Ti	48	22	26	47.947948	418.7148	8.72
V	51	23	28	50.943978	445.8457	8.74
Cr	52	24	28	51.940514	456.3614	8.78
Mn	55	25	30	54.938054	482.0866	8.77
Fe	56	26	30	55.93493	492.2856	8.79
Co	59	27	32	58.933189	517.3392	8.77
Ni	58	28	30	57.93534	506.4817	8.73
Cu	63	29	34	62.92959	551.4135	8.75
Zn	64	30	34	63.929145	559.1179	8.74
Ga	69	31	38	68.92568	601.9222	8.72

นิวไคลด์	A	Z	$N = A - Z$	มวล	พลังงานยึดเหนี่ยว (แอมอีวี)	พลังงานยึดเหนี่ยว ต่อนิวคลีออน
Ge	74	32	42	73.92115	645.7176	8.73
As	75	33	42	74.92158	652.6061	8.70
Se	80	34	46	79.91651	696.9054	8.71
Br	79	35	44	78.91835	646.3375	8.69
Kr	84	36	48	83.911504	732.2912	8.72
Rb	85	37	48	84.91171	739.3883	8.70
Sr	88	38	50	87.9056	768.5126	8.73
Y	89	39	50	88.9054	775.9879	8.72
Zr	90	40	50	89.9043	784.3025	8.71
Nb	93	41	52	92.9060	806.1508	8.67
Mo	98	42	56	97.9055	846.1932	8.63
Tc	99	43	56	98.9064	852.6438	8.61
Ru	102	44	58	101.90434	877.9946	8.61
Rh	103	45	58	102.90551	884.1891	8.58
Pd	106	46	60	105.90348	909.5156	8.58
Ag	107	47	60	106.90508	915.3105	8.55
Cd	114	48	66	113.90336	972.6350	8.53
In	115	49	66	114.90386	979.4629	8.52
Sn	120	50	70	119.90219	1020.5886	8.50
Sb	121	51	70	120.90381	1026.3825	8.48
Te	130	52	78	129.90623	1095.7842	8.43
I	127	53	74	126.90447	1072.6222	8.45
Xe	132	54	78	131.90416	1112.4904	8.43
Cs	133	55	78	132.9051	1118.8991	8.41
Ba	138	56	82	137.9050	1158.5717	8.40
La	139	57	82	138.9061	1164.8314	8.38
Ce	140	58	82	139.90528	1172.8889	8.38
Au	197	79	118	196.96655	1559.4707	7.92
Hg	200	80	120	199.96834	1581.2305	7.91
Pb	208	82	126	207.97664	1636.515	7.87
Bi	209	83	126	208.98042	1640.2876	7.85
Th	232	90	142	232.03821	1766.6176	7.61
U	238	92	146	238.0508	1801.7538	7.57

ตารางที่ 2 แสดงคุณสมบัติและค่าภาคตัดขวางสำหรับเทอร์มอลนิวตรอนกับธาตุต่าง ๆ

Atomic No.	Element or Compound	Atomic or Mol. Wt.	Density, g/cm ³	Nuclei per unit Vol. $\times 10^{24}$	ξ	Microscopic Cross Section, barns		Macroscopic Cross Section, cm ⁻¹	
						σ_a	σ_s	Σ_a	Σ_s
1	H	1.008	8.9 ^a	5.3 ^a	1.000	0.33	3.8	1.7'	0.002
	H ₂ O	18.016	1	0.0335"	0.948	0.66	103	0.022	3.45
	D ₂ O	20.030	1.10	0.0331 ^b	0.570	0.001	13.6	3.3"	0.449
2	He	4.003	17.8 ^a	2.6'	0.425	0.007	0.8	0.02'	2.1'
3	Li	6.940	0.634	0.0463	0.268	71	1.4	3.29	0.065
4	Be	9.013	1.85	0.1236	0.209	0.010	7.0	124 ^a	0.865
	BeO	25.02	3.025	0.0728 ^b	0.173	0.010	6.8	53"	0.501
5	B	10.82	2.45	0.1364	0.171	755	4	103	0.346
6	C	12.011	1.60	0.0803	0.158	0.004	4.8	32'	0.385
7	N	14.008	0.0013	5.3 ^a	0.136	1.88	10	9.9'	50 ^a
8	O	16.000	0.0014	5.3 ^a	0.120	20'	4.2	0.000	21'
9	F	19.00	0.0017	5.3 ^a	0.102	0.01	3.9	0.05 ^a	20 ^a
10	Ne	20.183	0.0009	2.6'	0.0968	12.8	2.4	7.3 ^a	6.2"
11	Na	22.991	0.971	0.0254	0.0845	0.525	4	0.013	0.102
12	Mg	24.32	1.74	0.0431	0.0811	0.069	3.6	0.003	0.155
13	Al	26.98	2.699	0.0802	0.0723	0.241	1.4	0.015	0.084
14	Si	28.09	2.42	0.0522	0.0698	0.16	1.7	0.008	0.089
15	P	30.975	1.83	0.0354	0.0632	0.20	5	0.007	0.177
16	S	32.066	2.07	0.0389	0.0612	0.52	1.1	0.020	0.043
17	Cl	35.457	0.0032	5.3 ^a	0.0561	33.8	16	0.003	80 ^a
18	Ar	39.944	0.0018	2.6'	0.0492	0.66	1.5	1.7'	3.9
19	K	39.100	0.87	0.0134	0.0504	2.07	1.5	0.028	0.020
20	Ca	40.08	1.55	0.0233	0.0492	0.44	3.0	0.010	0.070
21	Sc	44.96	2.5	0.0335	0.0438	24	24	0.804	0.804
22	Ti	47.90	4.5	0.0566	0.0411	5.8	4	0.328	0.226
23	V	50.95	5.96	0.0704	0.0387	5	5	0.352	0.352
24	Cr	52.01	7.1	0.0822	0.0385	3.1	3	0.255	0.247
25	Mn	54.94	7.2	0.0789	0.0359	13.2	2.3	1.04	0.181
26	Fe	55.85	7.86	0.0848	0.0353	2.62	11	0.222	0.933
27	Co	58.94	8.9	0.0190	0.0335	3.8	7	3.46	0.637
28	Ni	58.71	8.90	0.0913	0.0335	4.6	17.5	0.420	1.60

29	Cu	63.54	8.94	0.0848	0.0309	3.85	7.2	0.326	0.611
30	Zn	65.38	7.14	0.0658	0.0304	1.10	3.6	0.072	0.237
31	Ga	69.72	5.91	0.0511	0.0283	2.80	4	0.143	0.204
32	Ge	72.60	5.36	0.0445	0.0271	2.45	3	0.109	0.134
33	As	74.91	5.73	0.0461	0.0264	4.3	6	0.198	0.277
34	Se	78.96	4.8	0.0366	0.0251	12.3	11	0.450	0.403
35	Br	79.916	3.12	0.0235	0.0247	6.7	6	0.157	0.141
36	Kr	83.80	0.0037	2.6*	0.0236	31	7.2	81*	19*
37	Rb	85.48	1.53	0.0108	0.0233	0.73	12	0.008	0.130
38	Sr	87.63	2.54	0.0175	0.0226	1.21	10	0.021	0.175
39	Y	88.92	5.51	0.0373	0.0223	1.31	3	0.049	0.112
40	Zr	91.22	6.4	0.0423	0.0218	0.185	8	0.008	0.338
41	Nb	92.91	8.4	0.0545	0.0214	1.16	5	0.063	0.273
42	Mo	95.95	10.2	0.0640	0.0207	2.70	7	0.173	0.448
43	Tc	98			0.0203	22			
44	Ru	101.1	12.2	0.0727	0.0197	2.56	6	0.186	0.436
45	Rh	102.91	12.5	0.0732	0.0193	149	5	10.9	0.366
46	Pd	106.4	12.16	0.0689	0.0187	8	3.6	0.551	0.248
47	Ag	107.88	10.5	0.0586	0.0184	63	6	3.69	0.352
48	Cd	112.41	8.65	0.0464	0.0178	2450	7	114	0.325
49	In	114.82	7.28	0.0382	0.0173	191	2.2	7.30	0.084
50	Sn	118.70	6.5	0.0330	0.0167	0.625	4	0.021	0.132
51	Sb	121.76	6.69	0.0331	0.0163	5.7	4.3	0.189	0.142
52	Te	127.61	6.24	0.0295	0.0155	4.7	5	0.139	0.148
53	I	126.91	4.93	0.0234	0.0157	7.0	3.6	0.164	0.084
54	Xe	131.30	0.0059	2.7*	0.0152	35	4.3	95*	12*
55	Cs	132.91	1.873	0.0085	0.0150	28	20	0.238	0.170
56	Ba	137.36	3.5	0.0154	0.0145	1.2	8	0.018	0.123
57	La	138.92	6.19	0.0268	0.0143	8.9	15	0.239	0.403
58	Ce	140.13	6.78	0.0292	0.0142	0.73	9	0.021	0.263
59	Pr	140.92	6.78	0.0290	0.0141	11.3	4	0.328	0.116
60	Nd	144.27	6.95	0.0290	0.0138	46	16	1.33	0.464
61	Pm	145			0.0137	60			
62	Sm	150.35	7.7	0.0309	0.0133	5600	5	173	0.155
	Sm ₂ O ₃	348.70	7.43	0.0128 ^b	0.076	11,200	22.6	143	0.289
63	Eu	152	5.22	0.0207	0.0131	4300	8	89.0	0.166
	Eu ₂ O ₃	352.00	7.42	0.0127 ^b	0.063	8600	30.2	109	0.383

Atomic No.	Element or Compound	Atomic or Mol. Wt.	Density, g/cm ³	Nuclei per Unit Vol. $\times 10^{-24}$	ξ	Microscopic Cross Section, barns		Macroscopic Cross Section, cm ⁻¹	
						σ_a	σ_s	Σ_a	Σ_s
64	Gd	157.26	7.95	0.0305	0.0127	46,000		1403	
65	Tb	158.93	8.33	0.0316	0.0125	46		1.45	
66	Dy	162.51	8.56	0.0317	0.0122	950	100	30.1	3.17
	Dy ₂ O ₃	372.92	7.81	0.0126 ^b	0.019	2200	214	27.7	2.7
67	Ho	164.94	8.76	0.0320	0.0121	65		2.08	
68	Er	167.27	9.16	0.0330	0.0119	173	15	5.71	0.495
69	Tm	168.94	9.35	0.0333	0.0118	127	7	4.23	0.233
70	Yb	173.04	7.01	0.0244	0.0115	37	12	0.903	0.293
71	Lu	174.99	9.74	0.0335	0.0114	112		3.75	
72	Hf	178.5	13.3	0.0449	0.0112	105	8	4.71	0.359
73	Ta	180.95	16.6	0.0553	0.0110	21	5	1.16	0.277
74	W	183.86	19.3	0.0632	0.0108	19.2	5	1.21	0.316
75	Re	186.22	20.53	0.0664	0.0107	86	14	5.71	0.930
76	Os	190.2	22.48	0.0712	0.0105	15.3	11	1.09	0.783
77	Ir	192.2	22.42	0.0703	0.0104	440		30.9	
78	Pt	195.09	21.37	0.0660	0.0102	8.8	10	0.581	0.660
79	Au	197	19.32	0.0591	0.0101	98.8	9.3	5.79	0.550
80	Hg	200.61	13.55	0.0407	0.0099	380	20	15.5	0.814
81	Tl	204.39	11.85	0.0349	0.0098	3.4	14	0.119	0.489
82	Pb	207.21	11.35	0.0330	0.0096	0.170	11	0.006	0.363
83	Bi	209	9.747	0.0281	0.0095	0.034	9	0.001	0.253
84	Po	210	9.24	0.0265	0.0095				
85	At	211			0.0094				
86	Rn	222	0.0097	2.6 ^a	0.0090	0.7			
87	Fr	223			0.0089				
88	Ra	226.05	5	0.0133	0.0088	20		0.266	
89	Ac	227			0.0088	510			
90	Th	232.05	11.3	0.0293	0.0086	7.56	12.6	0.222	0.369
91	Pa	231	15.4	0.0402	0.0086	200		8.04	
92	U	238.07	18.9	0.04783	0.0084	7.68	8.3	0.367	0.397
	UO ₂	270.07	10	0.0223 ^b	0.036	7.7	16.7	0.17	0.372
93	Np	237			0.0084	170			
94	Pu	239	19.7	0.0497	0.0083	1029	9.6	51.1	0.478

^a Value has been multiplied by 10³.^b Molecules/cm³

ตารางนิวไคลด์

ตารางที่ 3 แสดงคุณสมบัติของนิวไคลด์

จาก "Nuclear Data Sheets," edited by the Nuclear Data Group of the National Academy of Sciences National Research Council, Washington, D.C., through Vol.5, No.3.

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Neutron	${}^0_0\text{n}^1$		1.0086654	1/2	12.8m	β^- 0.782
Hydrogen	${}^1_1\text{H}^1$	99.9844-99.9867	1.0078252	1/2		
	${}^1_1\text{H}^2$	0.0133-0.0156	2.0141022	1		
	${}^1_1\text{H}^3$		3.0160494	1/2	12.26y	β^- 0.0186
Helium	${}^2_2\text{He}^3$	1.3×10^{-4} (atm) 1.7×10^{-5} (well) ~100	3.0160290	1/2		
	${}^2_2\text{He}^4$		4.0026030	0		
	${}^2_2\text{He}^6$		6.01890	0	0.82s	β^- 3.51
Lithium	${}^3_3\text{Li}^6$	7.42	6.015126	1		
	${}^3_3\text{Li}^7$	92.58	7.016005	3/2		
	${}^3_3\text{Li}^8$		8.022488		0.84s	β^- 13; 2α
	${}^3_3\text{Li}^9$		9.028		0.17s	β^- ~8; n; 2α
Beryllium	${}^4_4\text{Be}^7$		7.016931		53.6d	EC; γ 0.477
	${}^4_4\text{Be}^8$		8.005308		10^{-16} s	2α 0.047
	${}^4_4\text{Be}^9$	100	9.012186	3/2		
	${}^4_4\text{Be}^{10}$		10.013535		2.5×10^6 y	θ^- 0.555
	${}^4_4\text{Be}^{11}$		11.02166		13.6s	β^- 11.5, 9.3
Boron	${}^5_5\text{B}^8$		8.024612		0.78s	β^+ 13.7; 2α
	${}^5_5\text{B}^{10}$	19.61	10.012939	3		
	${}^5_5\text{B}^{11}$	80.39	11.0093051	3/2		
	${}^5_5\text{B}^{12}$		12.014353		0.020m	β^- 13.37; (α , γ)
	${}^5_5\text{B}^{13}$		13.017779		~0.035s	β^-
Carbon	${}^6_6\text{C}^{10}$		10.01683		19.1s	β^+ 2.1; γ 0.72
	${}^6_6\text{C}^{11}$		11.011433	3/2	20.4m	β^+ 0.99
	${}^6_6\text{C}^{12}$	98.893	12.000000	0		
	${}^6_6\text{C}^{13}$	1.107	13.003354	1/2		
	${}^6_6\text{C}^{14}$		14.0032419	0	5720y	β^- 0.155
	${}^6_6\text{C}^{15}$		15.010600		2.4s	β^- 4.51, 9.82; γ 5.30
	${}^6_6\text{C}^{16}$		16.01470		0.74s	β^- ; n
Nitrogen	${}^7_7\text{N}^{12}$		12.01871		0.011s	β^+ 16.6; (3α)
	${}^7_7\text{N}^{13}$		13.005739	1/2	10.0m	β^+ 1.19
	${}^7_7\text{N}^{14}$	99.634	14.0030744	1		
	${}^7_7\text{N}^{15}$	0.366	15.000108	1/2		
	${}^7_7\text{N}^{16}$		16.00609		7.38s	β^- 4.26, 10.4, 3.3; γ 6.13 (others)
	${}^7_7\text{N}^{17}$		17.00845		4.14s	β^- 3.7; n 0.9
Oxygen	${}^8_8\text{O}^{14}$		14.008597		72s	β^+ 1.83; $^+ 2.3$
	${}^8_8\text{O}^{15}$		15.003072	1/2	2.0m	β^+ 1.72
	${}^8_8\text{O}^{16}$	99.759	15.9949149	0		
	${}^8_8\text{O}^{17}$	0.0374	16.999133	5/2		
	${}^8_8\text{O}^{18}$	0.2039	17.9991598	0		
	${}^8_8\text{O}^{19}$		19.003577		29.4s	β^- 3.25, 4.60; γ 0.20(m), 1.37
	${}^8_8\text{O}^{20}$		20.00407		13.6s	β^- 2.69; γ 1.06
Fluorine	${}^9_9\text{F}^{17}$		17.002098		66s	β^+ 1.75
	${}^9_9\text{F}^{18}$		18.000950		110m	β^+ 0.649
	${}^9_9\text{F}^{19}$	100	18.998405	1/2		
	${}^9_9\text{F}^{20}$		19.999985		11.5s	β^- 5.41; γ 1.63
	${}^9_9\text{F}^{21}$		20.99997		4.32s	β^- 6.1, 4.4, 5.8; γ 0.35, 1.39
Neon	${}^{10}_{10}\text{Ne}^{18}$		18.00572		1.5s	β^+ 3.2; (γ)
	${}^{10}_{10}\text{Ne}^{19}$		19.001892		17s	β^+ 2.24
	${}^{10}_{10}\text{Ne}^{20}$	90.92	19.9924404	0		
	${}^{10}_{10}\text{Ne}^{21}$	0.257	20.993849	3/2		
	${}^{10}_{10}\text{Ne}^{22}$	8.82	21.991385	0		
	${}^{10}_{10}\text{Ne}^{23}$		22.994475		38s	β^- 4.39, 3.95; γ 0.438 (others)
	${}^{10}_{10}\text{Ne}^{24}$		23.99360		3.4m	β^- 1.98; γ 0.472 (m), (0.878)

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Sodium	^{23}Na		22.989769		0.34μ	β^+ ; $\alpha > 2$
	^{22}Na		21.994435		2.2μ	β^+ 2.51; (γ)
	^{24}Na		23.990967		$2.58y$	β^+ 0.544; EC; γ 1.274
	^{22}Na	100	22.989773	3/2		
	^{24}Na		23.990967	4	15.0h	β^- 1.39; γ 1.368, 2.758
	^{24m}Na				0.02s	IT 0.472; $\beta^- \sim 6$
	^{26}Na		25.9917		60s	β^- 3.8, 2.8; γ 0.98, 0.58, 0.40
Magnesium	^{24}Mg		23.985045		1.0s	β^- 6.7; γ 1.82
	^{25}Mg		24.985840			
	^{26}Mg	78.70	25.982591	0		β^+ ; γ 0.074, 0.59
	^{27}Mg	10.13	26.984345	5/2	12s	β^+ 3.09, (2.64); (γ 0.44)
	^{28}Mg	11.17	27.98388	0		
	^{28}Mg				9.5m	β^- 1.75, 1.59; γ 0.834, 1.015 (others)
	^{28}Mg				21.3h	β^- 0.46; γ 0.032, 1.35, 0.40, 0.95
Aluminium	^{27}Al		26.981535		2.1s	β^+ 8.7, 4.5; γ 1.39, 2.73, 4.22 (others)
	^{26}Al		25.986900		7.3s	β^+ 3.24; (γ)
	^{28}Al		27.981908	5	7.4×10^6y	β^+ 1.16; (EC); γ 1.83 (others)
	^{29}Al		28.98044	0	6.4s	β^+ 3.21
	^{30}Al	100	29.9812	5/2		
	^{31}Al		30.975349		2.3m	β^- 2.87; γ 1.78
	^{32}Al		31.97402		6.6m	β^- 2.5, 1.3; γ 1.28, 2.43
Silicon	^{28}Si		27.976927		3.3s	β^- 5.05; γ 2.26, 3.52
	^{29}Si		28.976491			
	^{30}Si	92.21	29.973781	0		β^+ 3.76, 2.94; γ 0.82
	^{31}Si	4.70	30.975349	1/2	2.1s	β^+ 3.85; (γ)
	^{32}Si	3.09	31.97402	0	4.2s	
	^{33}Si		32.9710			β^- 1.48; (γ)
	^{34}Si		33.9733		710y	$\beta^- \sim 0.1$
Phosphorus	^{31}P		30.973763		0.28s	β^+ 10.6, others; γ 1.8-7.6
	^{32}P		31.973908		4.3s	β^+ 3.95; (γ)
	^{33}P		32.9710		2.50m	β^+ 3.24; (γ)
	^{34}P	100	33.9733	1/2		
	^{35}P			1	14.3d	β^- 1.71
	^{36}P				25d	β^- 0.24
	^{37}P				12.4s	β^- 5.1, 3.0; γ 2.1
Sulfur	^{32}S		31.972074		1.4s	β^+ 4.30, 4.98; γ 0.68
	^{33}S		32.971460		2.6s	β^+ 4.39; (γ)
	^{34}S	95.0	33.967864	0		
	^{35}S	0.760	34.969034	3/2		
	^{36}S	4.22	35.96709	0	87d	β^- 0.167
	^{37}S	0.014	36.9710	3/2		
	^{38}S		37.9712	0	5.1m	β^- 1.6, 4.8; γ 3.1
Chlorine	^{35}Cl		34.968854		2.87h	β^- 1.1; γ 1.88
	^{36}Cl		35.96831			
	^{37}Cl		36.965896			
	^{38}Cl		37.96800			
	^{35}Cl	75.53	34.968854	3/2	0.31s	β^+ 9.5, 5, 8.2; γ 2.2, 4.8 (others)
	^{36}Cl		35.96831	2	2.6s	β^+ 4.5; (γ)
	^{37}Cl	24.47	36.965896	3/2	1.6s	β^+ 4.4
	^{38}Cl		37.96800		32.4m	β^+ 2.41, 1.24; IT γe^- 0.145; γ 2.14, 3.32, 1.16
	^{39}Cl					
	^{40}Cl					
	^{41}Cl					
	^{42}Cl					
	^{43}Cl					
	^{44}Cl					

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
	Cl ³⁹		38.96800		56m	β^- 1.91 (others); γ 1.27, 0.25, 1.52
	Cl ⁴⁰		39.9704		1.4m	β^- $\sim$ 3.2, $\sim$ 7.5; γ 1.46, 2.75, 6.0
Argon	¹⁸ Ar ³⁶		34.97528		1.84s	β^+ 4.95; (γ)
	Ar ³⁶	0.337	35.967548	0		
	Ar ³⁷		36.966772	3/2	35.0d	EC
	Ar ³⁸	0.063	37.962725	0		
	Ar ³⁹		38.96432		270y	β^- 0.565
	Ar ⁴⁰	99.600	39.962384	0		
	Ar ⁴¹		40.96451		1.83h	β^- 1.20; γ 1.29
	Ar ⁴²		41.96304		34y	β^-
Potassium	¹⁹ K ³⁷		36.97336		1.2s	β^+ 5.1
	K ³⁸		37.96909		7.7m	β^+ 2.68; γ 2.16
	K ³⁹	93.10	38.963714	3/2	0.95s	β^+ 5.0
	K ⁴⁰	0.0118	39.964008	4	1.27×10^9 y	β^- 1.32; EC; γ 1.46; (β^+)
	K ⁴¹	6.88	40.961835	3/2		
	K ⁴²		41.96242	2	12.36h	β^- 3.55, 1.98; γ 1.52
	K ⁴³		42.96073	3/2	22.4h	β^- 0.83 (others); γ 0.619, 0.374 (others)
	K ⁴⁴		43.9620		22m	β^- 2.63, 4.9; γ 1.16, others
	K ⁴⁵				34m	β^-
Calcium	²⁰ Ca ³⁸		37.9758		0.66s	β^+ ; γ 3.5
	Ca ³⁹		38.97071		0.88s	β^+ 5.5
	Ca ⁴⁰	96.97	39.962589	0		
	Ca ⁴¹		40.96228	7/2	1.1×10^5 y	EC
	Ca ⁴²	0.64	41.958628			
	Ca ⁴³	0.145	42.958780	7/2		
	Ca ⁴⁴	2.06	43.955490			
	Ca ⁴⁵		44.956189		165d	β^- 0.255
	Ca ⁴⁶	0.0033	45.95369			
	Ca ⁴⁷		46.95451		4.5d	β^- 1.94, 0.66; γ 1.31 (others)
	Ca ⁴⁸	0.185	47.95236			
	Ca ⁴⁹		48.95566		8.8m	β^- 1.95, 0.89; γ 3.10, 4.05
Scandium	²¹ Sc ⁴⁰		39.9775		0.2s	β^+ 9.2; γ 3.75
	Sc ⁴¹		40.96925		0.55s	β^+ 5.6
	Sc ⁴²		41.96551		0.68s	β^+ 5.4
	Sc ^{43m}		41.96623		62s	β^+ 2.87; γ 0.44, 1.23, 1.52
	Sc ⁴³		42.96116	7/2	3.9h	β^+ 1.18, 0.82; EC; γ 0.37
	Sc ⁴⁴		43.95941	2	3.9h	β^+ 1.47; γ 1.16 (others); (EC)
	Sc ^{44m}		43.95970	6	2.44d	IT γ 0.27; (EC; γ)
	Sc ⁴⁵	100	44.955919	7/2		
	Sc ⁴⁶		45.95517	4	84d	β^- 0.357; γ 1.119, 0.887
	Sc ^{46m}		45.95532		20s	IT γ 0.142
	Sc ⁴⁷		46.95240		3.44d	β^- 0.44, 0.60; γ 0.160
	Sc ⁴⁸		47.95223		1.83d	β^- 0.65; γ 1.04, 1.31, 0.99, (0.18)
	Sc ⁴⁹		48.95002		57m	β^- 2.0; (γ)
	Sc ⁵⁰		49.9516		1.8m	β^- $\sim$ 3.5; γ 1.17, 1.59, 0.51
	Sc ^{50m}				0.35s	IT γ 0.26
Titanium	²² Ti ⁴³		42.96850		0.6s	β^+ 5.8
	Ti ⁴⁴		43.95957		$\sim$ 50y	EC (to 3.9h Sc ⁴⁴); γ 0.068, 0.078
	Ti ⁴⁴		44.95813	7/2	3.08h	β^+ 1.02; EC; (γ)
	Ti ^{44m}				0.006s	IT 0.28
	Ti ⁴⁶	7.93	45.952633			
	Ti ⁴⁷	7.28	46.95176	5/2		
	Ti ⁴⁸	73.94	47.947948			
	Ti ⁴⁹	5.51	48.947867	7/2		
	Ti ⁵⁰	5.34	49.944789			
	Ti ⁵¹		50.94662		5.9m	β^- 2.14; γ 0.32 (others)
	Ti ⁵²				12m	β^-

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Vanadium	$^{51}\text{V}^{49}$		45.96023		0.4s	β^+ 6.05
	$^{51}\text{V}^{47}$		46.95489		31m	β^+ 1.89; (γ)
	$^{51}\text{V}^{48}$		47.95226		16.1d	β^+ 0.69; EC; γ 1.31, 0.99 0.95, 2.23
	$^{51}\text{V}^{49}$		48.94852	7/2	330d	EC
	$^{51}\text{V}^{50}$	0.24	49.947165	6	$6 \times 10^{15}\text{y}$	β^- 0.4; EC; γ 0.78, 1.59
	$^{51}\text{V}^{51}$	99.76	50.943978	7/2		
	$^{51}\text{V}^{52}$		51.94480		3.77m	β^- 2.6; γ 1.44
	$^{51}\text{V}^{53}$		52.94337		2m	β^- 2.5; γ 1.00, (1.29)
	$^{51}\text{V}^{54}$				55s	β^- 3.3; γ 0.84, 0.99, 2.2
Chromium	$^{52}\text{Cr}^{46}$				1.1s	β^+
	$^{52}\text{Cr}^{48}$		47.9538		23h	EC; γ 0.116, 0.305 (m)
	$^{52}\text{Cr}^{49}$		48.95127		41.7m	β^+ 1.54, 1.39, 1.46; γ 0.089, 0.063, 0.15; (EC)
	$^{52}\text{Cr}^{50}$	4.31	49.946051			
	$^{52}\text{Cr}^{51}$		50.944786	7/2	27.8d	EC; (γ 0.32)
	$^{52}\text{Cr}^{52}$	83.76	51.940514			
	$^{52}\text{Cr}^{53}$	9.55	52.940651	3/2		
	$^{52}\text{Cr}^{54}$	2.38	53.938879			
	$^{52}\text{Cr}^{55}$		54.9411		3.5m	β^- 2.85
	$^{52}\text{Cr}^{56}$		55.9406		5.9m	β^- 1.50; γ 0.026, 0.083
Manganese	$^{55}\text{Mn}^{50}$		49.9540		0.28s	β^+ 6.58
	$^{55}\text{Mn}^{50}$				2.0m	β^+ ; γ 0.66-1.45
	$^{55}\text{Mn}^{51}$		50.94820		45m	β^+ 2.2; (γ)
	$^{55}\text{Mn}^{52}$		51.94556	6	5.7d	EC; β^+ 0.57; γ 0.747, 0.936 1.434 (others)
	$^{55}\text{Mn}^{53m}$		51.94597		21m	β^+ 2.63; γ 1.43 (others?); (IT 0.38)
	$^{55}\text{Mn}^{53}$		52.94129	7/2	$\sim 2 \times 10^4\text{y}$	EC
	$^{55}\text{Mn}^{54}$		53.94036	3	280d	EC; γ 0.835
	$^{55}\text{Mn}^{55}$	100	54.938064	5/2		
	$^{55}\text{Mn}^{56}$		55.93891	3	2.58h	β^- 2.84; 1.03, 0.72; γ 0.85, 1.81, 2.12 (others)
	$^{55}\text{Mn}^{57}$		56.9383		1.7m	β^- 2.6; γ 0.12, 0.13
Iron	$^{56}\text{Fe}^{56}$				1.1m	β^- ; γ 0.36-2.8
	$^{56}\text{Fe}^{52}$		51.94812		8.3h	β^+ 0.80, EC (both to Mn^{52m}); γ 0.17
	$^{56}\text{Fe}^{53}$		52.94558		8.9m	β^+ 2.8, 2.4, 1.6; γ 0.38 (others)
	$^{56}\text{Fe}^{54}$	5.82	53.93962			
	$^{56}\text{Fe}^{55}$		54.938302		2.60y	EC
	$^{56}\text{Fe}^{56}$	91.66	55.93493			
	$^{56}\text{Fe}^{57}$	2.19	56.93539	1/2		
	$^{56}\text{Fe}^{58}$	0.33	57.93327			
	$^{56}\text{Fe}^{59}$		58.93487		45d	β^- 0.46, 0.27; γ 1.10, 1.29 (others)
	$^{56}\text{Fe}^{60}$				$\sim 1 \times 10^4\text{y}$	β^- 0.14 (to Co^{60m}); γ 0.027
Cobalt	$^{59}\text{Co}^{61}$				6.0m	β^- 2.8; γ 0.29
	$^{59}\text{Co}^{54}$		53.9484		0.19s	β^+ 7.34
	$^{59}\text{Co}^{54m}$				1.5m	β^+ 4.5; γ 0.41, 1.1, 1.4
	$^{59}\text{Co}^{55}$		54.94202	7/2	18h	β^+ 1.50, 1.03; EC; γ 0.94, 1.41, 0.48, (0.25)
	$^{59}\text{Co}^{56}$		55.93987	4	77d	EC; β^+ 1.46; γ 0.845, 1.24, others 0.98-3.5
	$^{59}\text{Co}^{57}$		56.93629	7/2	270d	EC; $\gamma(e^-)$ 0.122, $e^-(\gamma)$ 0.0144(m), (γ 0.136)
	$^{59}\text{Co}^{58}$		57.93575		71d	EC; β^+ 0.48; γ 0.81 (others)
	$^{59}\text{Co}^{58m}$		57.93578		9.0h	IT $e^-(\gamma)$ 0.025
	$^{59}\text{Co}^{59}$	100	58.933189	7/2		
	$^{59}\text{Co}^{60}$		59.93381	5	5.26y	β^- 0.32; γ 1.173, 1.333
$^{59}\text{Co}^{60m}$		59.93387		10.6m	IT $e^-(\gamma)$ 0.059; (β^-)	
$^{59}\text{Co}^{61}$		60.93243		1.65h	β^- 1.22; γ 0.07	
$^{59}\text{Co}^{62}$		61.93395		13.9m	β^- 2.88, 0.88; γ 1.17, others	
$^{59}\text{Co}^{63}$				1.7m	β^- ; γ	
$^{59}\text{Co}^{64}$				1.4h	β^- ; γ	

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Nickel	Co ⁶³				52s	β^- 3.6
	Co ⁶⁴				7.8m	β^- , γ 0.66, 0.97, 1.34 (others)
	Co ^{64m}				2m	γ
	Ni ⁶⁶				6.1d	EC; γ 0.164, 0.820, 0.755, 0.27, 0.48, 1.57 (others)
	Ni ⁶⁷		56.93976		37h	EC; β^+ 0.85 (others); γ 1.37, 0.13, 1.90 (others)
	Ni ⁶⁸	67.88	57.93534			
	Ni ⁶⁹		58.934344		8×10^4 y	EC
	Ni ⁷⁰	26.23	59.93078			
	Ni ⁷¹	1.19	60.93105	3/2		
	Ni ⁷²	3.66	61.92835			
	Ni ⁷³		62.92967		92y	β^- 0.067
	Ni ⁷⁴	1.08	63.92796			
	Ni ⁷⁵		64.93004		2.56h	β^- 2.10, 0.60, 1.01; γ 1.46, 1.11, 0.37 (others)
	Ni ⁷⁶		65.92909		55h	β^- 0.20
Copper	Cu ⁶³		57.94447		3.2s	β^+ 7.48, 4.6; γ 1.45, 2.9
	Cu ⁶⁴		58.93950		81s	β^+ 3.7 (others); γ 1.31, 0.87, others
	Cu ⁶⁵		59.93738	2	24m	β^+ 2.00, 3.00, 3.9; (EC); γ 1.33, 1.76, 0.85 (others)
	Cu ⁶⁶		60.93344	3/2	3.32h	β^+ 1.22 (others); EC; γ 0.28, 0.66 (others)
	Cu ⁶⁷		61.93256	1	9.9m	β^+ 2.91; (EC); (γ)
	Cu ⁶⁸	69.09	62.92959	3/2		
	Cu ⁶⁹		63.92976	1	12.8h	EC; β^- 0.573; β^+ 0.856; (γ 1.34)
	Cu ⁷⁰	30.91	64.92779	3/2	5.1m	β^- 2.63, (1.59); (γ 1.04)
	Cu ⁷¹		65.92887		61h	β^- 0.40, 0.48, 0.58; γ 0.18, 0.092 (others)
	Cu ⁷²		66.92776		32s	β^- 3.0; γ 1.08-2.32
Zinc	Zn ⁶⁰				2.1m	β^+
	Zn ⁶¹		60.9392		1.48m	β^+ 4.38, 3.9 (others); γ 0.48 (others)
	Zn ⁶²		61.93438		9.3h	EC; β^+ 0.67; γ 0.59, 0.042, 0.51 (others)
	Zn ⁶³		62.93321		38m	β^+ 2.34 (others); (EC); (γ 0.67, others)
	Zn ⁶⁴	48.89	63.929145	0		
	Zn ⁶⁵		64.92923	5/2	245d	EC; γ 1.11; (β^+ 0.33)
	Zn ⁶⁶	27.81	65.92605	0		
	Zn ⁶⁷	4.11	66.92715	5/2		
	Zn ⁶⁸	18.57	67.92486	0		
	Zn ⁶⁹		68.92665		55m	β^- 0.90
	Zn ^{69m}		68.92712		13.8h	IT $\gamma(e^-)$ 0.44
	Zn ⁷⁰	0.62	69.92535			
	Zn ⁷¹		70.9280		2.4m	β^- 2.6, 2.1 (others); γ 0.51 (others)
	Zn ^{71m}				4.1h	β^- 1.5; γ 0.38, 0.49, 0.61
	Zn ⁷²				49h	β^- 0.30; γ 0.14, (0.19)
Gallium	Ga ⁶⁴		63.93674		2.6m	β^+ 6.1, 2.8; γ 0.98, 3.3, 0.80, 1.3, 2.2 (others)
	Ga ⁶⁵		64.93278		15m	β^+ 2.11, 1.39, 2.24, 0.82; EC; γ 0.054(m), 0.115 (others 0.09-2.33)
	Ga ⁶⁶		65.93160	0	9.5h	β^+ 4.16 (others); EC; γ 1.04, 2.75 (others)
	Ga ⁶⁷		66.92822	3/2	78h	EC; γe^- 0.093(m), γ 0.184, 0.091, 0.296 (others)
	Ga ⁶⁸		67.92800	1	68m	β^+ 1.89; EC; (γ)
	Ga ⁶⁹	60.4	68.92568	3/2		
	Ga ⁷⁰		69.92605	1	21m	β^- 1.6 (others); (γ)
	Ga ^{70m}				0.02s	IT 0.19

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Germanium	Ga ⁷¹	39.6	70.92484	3/2	14.1h	β^- 0.64, 0.96, 0.56, 1.51; γ 0.835, 2.20 (others)
	Ga ⁷²		71.92803	3		
	Ga ^{72m}		72.9250		0.04s	IT 0.10
	Ga ⁷²				4.8h	β^- 1.19 (to 0.53s Ge ^{72m}); γ 0.30
	Ga ⁷⁴		73.9272		8m	β^- 2.7, 1.1 (others); γ 0.60, 2.35 (others)
	Ga ⁷⁵				2m	β^- 3.3; γ 0.58 (others)
	Ga ⁷⁶				32s	β^- ~6; γ 0.57 (others)
	³² Ge ⁶⁶		64.9378		1.6m	β^+ 3.7; (γ 0.67, 1.7)
	Ge ⁶⁶		65.9348		2.7h	β^+ 1.3; EC; γ 0.046-0.71
	Ge ⁶⁷		66.9329		19m	β^+ 3.2, 2.3, 1.6; γ 0.170 (others)
	Ge ⁶⁸		67.929		280d	EC
	Ge ⁶⁹		68.92808		40h	EC; β^+ 1.22 (others); γ 1.12, 0.58, 0.88 (others)
	Ge ⁷⁰	20.52	69.92428	0	11d	EC
	Ge ⁷¹		70.92509	1/2		
	Ge ^{71m}		71.92174	0	0.020s	IT 0.023; γ 0.17 (m)
	Ge ⁷²				72.9234	9/2
	Ge ⁷³	27.43				
	Ge ^{73m₁}	7.76			0.53s	IT $e^- \gamma$ 0.054; $e^- (\gamma)$ 0.013 (m ₁)
Ge ⁷⁴	36.54	73.92115	0			
Ge ⁷⁵		74.9228		82m	β^- 1.19, 0.92; γ 0.265, 0.20 (others)	
Ge ^{76m}	7.76	75.9214	0	49s	IT $e^- \gamma$ 0.138	
Ge ⁷⁶						
Ge ⁷⁷				76.9236	11.3h	β^- 2.20, 1.38, 0.71; γ 0.042-2.32
Ge ^{77m}				54s	β^- 2.90, 2.7; IT γe^- 0.159; γ 0.215	
Ge ⁷⁸		77.9227		2.1h	β^- 0.9; γ	
Arsenic	³³ As ⁶⁸		68.9323		~7m	β^+
	As ⁶⁹				15m	β^+ 2.9; γ 0.23
	As ⁷⁰		69.9313		50m	β^+ 1.35, 2.45; EC; γ 1.04, 2.0 (others)
	As ⁷¹		70.92725		65h	EC; β^+ 0.81; γ 0.17 (m)
	As ⁷²		71.9264		26h	EC; β^+ 2.50, 3.34, 1.84; γ 0.835 (others 0.63-3.7)
	As ⁷³				72.9238	76d
	As ⁷⁴		73.92391		18d	β^+ 0.91, (1.51); β^- 1.36, 0.72; EC; γ 0.59, 1.36, 0.72, 0.63 (others)
	As ^{74m}					IT 0.28
	As ⁷⁵	100	74.92158	3/2	8s	IT 0.305, 0.025; γ 0.280
	As ^{76m}		75.92242	2	0.017s	β^- 2.97, 2.41 (others); γ 0.559 (others)
	As ⁷⁶				26.8h	β^- 0.68; (γ)
	As ⁷⁷		76.92067		38.7h	β^- 4.1, 1.4; γ 0.615, 0.70, 1.31 (others)
	As ⁷⁸		77.9218		91m	IT γ 0.50
	As ^{78m}		78.9210		5.5m	β^- 2.15 (others); γ 0.097 (others)
	As ⁷⁹				9m	β^- 6.0, 5.4; γ 0.66, 1.64 (others)
	As ⁸⁰		79.9230		15s	β^- 3.8
	As ⁸¹				33s	β^- ; α
	As ⁸²				0.43s	
Selenium	³⁴ Se ⁷¹	0.87	70.9320	0	5m	β^+ 3.4; γ 0.16
	Se ⁷²				8.4d	EC; γe^- 0.046
	Se ⁷³		72.9267		7.1h	β^+ 1.32; EC; γ 0.359 (m); γe^- 0.066 (m)
	Se ^{73m}				44m	β^+ 1.72; γ 0.25, 0.09, 0.58
	Se ⁷⁴		73.9224			

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Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Se ⁷⁴		74.92251	5/2	120d	EC; γ 0.265, 0.136, 0.28, 0.40, 0.122 (others)
Se ⁷⁶	9.02	75.91923	0		
Se ⁷⁷	7.58	76.91993	1/2		
Se ^{77m}				18.8s	IT γe^- 0.162
Se ⁷⁸	23.52	77.91735	0		
Se ⁷⁹		78.91852	7/2	6.5×10^4 y	β^- 0.16
Se ^{79m}				3.9m	IT $e^-(\gamma)$ 0.096
Se ⁸⁰	49.82	79.91651	0		
Se ⁸¹		80.91786		18m	β^- 1.56 (others); (γ)
Se ^{81m}				57m	IT $e^-(\gamma)$ 0.103
Se ⁸²	9.19	81.9167	0		
Se ⁸³		82.9189		25m	β^- 1.0, 1.8; γ 0.23, 0.35, 1.85, 2.29
Se ^{83m}				69s	β^- 3.4, 1.5; γ 1.01, 2.02, 0.65, 0.35
Se ⁸⁴				3.3m	β^- (to 32m Br ⁸⁴)
Se ⁸⁵				39s	β^-
Se ⁸⁶				16s	β^-
Bromine					
³⁵ Br ⁷⁴		73.9289		26m	β^+ 4.7; γ 0.64
Br ⁷⁵		74.9254		1.6h	EC; β^+ 1.7, others; γ 0.29, (0.62)
Br ⁷⁶		75.9242	1	16h	β^+ 3.1, 3.6 (others); EC; γ 0.56, 0.65, 1.22, 1.86 (others)
Br ⁷⁷		76.92140	3/2	58h	EC; (β^+); γ 0.25 (m), 0.52, 0.58, 0.30 (others)
Br ^{77m}				4.2m	IT $e^- \gamma$ 0.108
Br ⁷⁸		77.9211		6.4m	β^+ 2.5, 1.9; (EC); γ 0.62
Br ⁷⁹	50.54	78.91835	3/2		
Br ^{79m}				4.8s	IT γe^- 0.21
Br ⁸⁰		79.91854	1	17.6m	β^- 2.02, 1.38; γ 0.62 (others); (EC, β^+)
Br ^{80m}			5	4.5h	IT $e^-(\gamma)$ 0.048; $e^- \gamma$ 0.036
Br ⁸¹	49.46	80.91634	3/2		
Br ⁸²		81.91680	5	35.3h	β^- 0.44; γ 0.25-1.48
Br ⁸³		82.91520		2.4h	β^- 0.94 (to Kr ^{83m}); γ 0.05
Br ⁸⁴		83.91655		32m	β^- 4.7, others; γ 0.88, 1.90, 3.9 (others)
Br ^{84m}				6.0m	β^- 1.9, 0.8; γ 0.88, 1.46, 0.44, 1.89
Br ⁸⁵		84.9154		3.0m	β^- 2.5
Br ⁸⁶				54s	β^- 7.1, others; γ 1.57, 2.76
Br ⁸⁷		86.9220		55s	β^- 2.6, 8.0; γ 5.4, others; (n)
Br ⁸⁸				16s	β^- ; (n)
Br ⁸⁹				4.5s	β^- ; (n)
Br ⁹⁰				1.6s	β^- ; (n)
Krypton					
³⁶ Kr ⁷⁴		73.9333		20m	β^+ 3.1
Kr ⁷⁶				5.5m	
Kr ⁷⁶				14.8h	EC; γ 0.039, 0.267, 0.316 (others)
Kr ⁷⁷		76.92449		1.2h	β^+ 1.67, 1.86; EC; γ 0.131, 0.149, 0.281, 0.665
Kr ⁷⁸	0.354	77.920368			
Kr ⁷⁹		78.92009		34.5h	EC; β^+ 0.60; (γ 0.045-0.83)
Kr ^{79m}				55s	IT 0.127
Kr ⁸⁰	2.27	79.91639			
Kr ⁸¹		80.9166		2.1×10^4 y	EC
Kr ^{81m}				13s	IT γe^- 0.19
Kr ⁸²	11.56	81.91348	0		
Kr ⁸³	11.55	82.91413	9/2		
Kr ^{83m}				1.9h	IT $e^-(\gamma)$ 0.033; $e^-(\gamma)$ 0.009 (m)
Kr ⁸⁴	56.90	83.911504	0		
Kr ⁸⁶		84.91243	9/2	10.6y	β^- 0.67; (γ)

TABLE OF NUCLIDES

Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Kr^{86m}				4.5h	β^- 0.82; γ 0.150; IT $\gamma(e^-)$ 0.305
Kr^{86}	17.37	85.91062	0		
Kr^{87}		86.91337		78m	β^- 3.8, 1.3; γ 0.40, 2.57, 0.85 (others)
Kr^{88}		87.9142		2.8h	β^- 0.52, 2.7; γ 2.40, 0.19, 0.85, others
Kr^{89}				3.2m	β^- 3.9, 2.0; γ 0.21, 0.45, 0.60, others
Kr^{90}				33s	β^- 3.2, others; γ 0.12, 0.55, 1.13, 1.53 (others)
Kr^{91}				10s	β^- 3.6, others; γ
Kr^{92}				3s	β^-
Kr^{93}				2.0s	β^-
Kr^{94}				1.4s	β^-
Kr^{96}				1-2s	β^-
Kr^{97}				$\sim 1s$	β^-
Rubidium Rb^{79}				24m	β^+ ; γ 0.15, 0.19; (EC)
Rb^{80}		79.9219		34s	β^+ 4.1, 3.5; γ 0.62; (EC)
Rb^{81}		80.9190	3/2	4.7h	EC; β^+ 1.0, 0.58, 0.33; γ 1.1, 0.25, 0.45
Rb^{81m}			9/2	32m	β^+ 1.4, IT 0.085
Rb^{82}		81.91796		1.3m	β^+ 3.15, 3.5, 4.2; (γ 0.77, 1.40); (EC)
Rb^{82m}			5	6.3h	EC; β^+ 0.80, 0.78, 0.67; γ 0.78, 0.62, 0.55, others
Rb^{83}			5/2	83d	EC; γ 0.53, 0.48, 0.046; [to Kr^{83m}]
Rb^{84}		83.91435	2	33d	EC; β^+ 0.80, 1.65; (β^-); γ 0.88 (others)
Rb^{84m}				20m	IT $\gamma(e^-)$ 0.216; γ 0.25, 0.47
Rb^{85}	72.15	84.91171	5/2		
Rb^{86}		85.91116	2	18.7d	β^- 1.78, (0.70); (γ 1.08)
Rb^{86m}				1.0m	IT γ 0.56
Rb^{87}	27.85	86.90918	3/2	$5.7 \times 10^{10}y$	β^- 0.27
Rb^{88}		87.9112	2	18m	β^- 5.3, 3.3; γ 1.85, 0.91 (others)
Rb^{89}		88.9112		15m	β^- 1.6, 3.9 (others); γ 1.05, 1.26, 0.66, 2.2, 2.6 (others)
Rb^{90}		89.9144		2.8m	β^- 1.2-6.6; γ 0.5-5.2
Rb^{91}				1.7m	β^- 4.6; γ 0.1
Rb^{91m}				14m	β^- 3.0; γ
Rb^{92}				4.2s	β^-
Rb^{93}				5.2s	β^-
Rb^{94}				2.9s	β^-
Strontium Sr^{80}				1.8h	EC; γ 0.58
Sr^{81}				29m	β^+
Sr^{82}				25d	EC
Sr^{83}				33h	EC; β^+ 1.15; γ 0.39, 0.76, others
Sr^{84}	0.56	83.91338			
Sr^{86}		84.9129		65d	EC; γ 0.514 (others)
Sr^{86m}		84.9132		70m	IT $e^-(\gamma)$ 0.0075; γ 0.225; EC; γ 0.15
Sr^{88}	9.86	85.9093	0		
Sr^{87}	7.02	86.9089	9.2		
Sr^{87m}				2.8h	IT γe^- 0.388; (EC)
Sr^{88}	82.56	87.9056	0		
Sr^{89}		88.9070		51d	β^- 1.46, (γ)
Sr^{90}		89.9073		29y	β^- 0.54
Sr^{91}		90.9098		9.7h	β^- 1.09, 1.36, 2.67; γ 1.03, 0.75, 0.65, 1.41
Sr^{92}		91.9105		2.7h	β^- 0.55, 1.5; γ 1.37 (others)
Sr^{93}				8m	β^- 3.0-4.8; γ 0.60, 0.88, others 0.18-3.0
Sr^{94}				1.3m	β^-
Sr^{96}				0.7m	β^-

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
	Sr^{87}				short	β^-
Yttrium	$^{89}\text{Y}^{89}$				10m	$\beta^+ 2$
	$^{90}\text{Y}^{90}$				7.4m	β^+
	$^{91}\text{Y}^{91}$				40m	$\beta^+ 2.5, 3.5$; EC; $\gamma 0.80, 0.98, 1.04$ (others)
	$^{92}\text{Y}^{92}$		84 9164		5.0h	$\beta^+ 2.24, 2.01$; EC; $\gamma 0.23$ (others); [to Sr^{88}]
	$^{93}\text{Y}^{93}$		84 9164		2.7h	$\beta^+ 1.54$; $\gamma 0.503$ (others); [to $\text{Sr}^{89\text{m}}$]
	$^{94}\text{Y}^{94}$		85 9148		14.6h	EC; $\beta^+ 1.32$ (others); $\gamma 0.18-3.3$
	$^{95\text{m}}\text{Y}^{95\text{m}}$				49m	IT $e^-(\gamma) 0.010$; $\gamma 0.210$
	$^{96}\text{Y}^{96}$		86 9107		80h	EC; $\gamma 0.483$; (β^+)
	$^{97\text{m}}\text{Y}^{97\text{m}}$				14h	IT $\gamma e^- 0.381$
	$^{98}\text{Y}^{98}$		87 9095		108d	EC; $\gamma 1.84, 0.90$; (β^+)
	$^{99}\text{Y}^{99}$	100	88 9054	1/2		
	$^{100\text{m}}\text{Y}^{100\text{m}}$				16s	IT $\gamma (e^-) 0.92$
	$^{101}\text{Y}^{101}$		89 9067	2	64h	$\beta^- 2.27$; (γ)
	$^{102\text{m}}\text{Y}^{102\text{m}}$				3.2h	IT $\gamma (e^-) 0.48$; $\gamma 0.20$
	$^{103}\text{Y}^{103}$		90 9069	1/2	58d	$\beta^- 1.54$; (γ)
	$^{104\text{m}}\text{Y}^{104\text{m}}$				50m	IT $\gamma (e^-) 0.551$
	$^{105}\text{Y}^{105}$		91 9085		3.6h	$\beta^- 3.6$ (others); $\gamma 0.932$ (others 0.07-2.4)
	$^{106}\text{Y}^{106}$		92 9092		10h	$\beta^- 2.89$; ($\gamma 0.27-2.4$)
	$^{107}\text{Y}^{107}$		93 9115		20m	$\beta^- 5.0$; $\gamma 0.56-3.5$
	$^{108}\text{Y}^{108}$				11m	β^-
	$^{109}\text{Y}^{109}$				2.3m	$\beta^- 3.5$; $\gamma 1.0, 0.7$ (others)
	$^{110}\text{Y}^{110}$				short	β^-
Zirconium	$^{90}\text{Zr}^{90}$				17h	EC; $\gamma 0.24$
	$^{91}\text{Zr}^{91}$		86 9145		1.6h	$\beta^+ 2.1$; (γ); [to 14h $^{91\text{m}}\text{Y}$]
	$^{92}\text{Zr}^{92}$				85d	EC; $\gamma 0.394$ (m)
	$^{93}\text{Zr}^{93}$		88 9085		79h	EC; $\beta^+ 0.90$ [to $^{93\text{m}}\text{Y}$]
	$^{94\text{m}}\text{Zr}^{94\text{m}}$				4.2m	IT $\gamma (e^-) 0.59$; (EC; β^+) ($\gamma 1.53$)
	$^{96}\text{Zr}^{96}$	51.46	89 9043			
	$^{98\text{m}}\text{Zr}^{98\text{m}}$				0.83s	IT 2.30
	$^{99}\text{Zr}^{99}$	11.23	90 9052	5/2		
	$^{100}\text{Zr}^{100}$	17.11	91 9046			
	$^{101}\text{Zr}^{101}$		92 9061		$1 \times 10^6\text{y}$	$\beta^- 0.063, 0.034$
	$^{102}\text{Zr}^{102}$	17.40	93 9061			
	$^{103}\text{Zr}^{103}$		94 9079		65d	$\beta^- 0.36, 0.40$ (others); $\gamma 0.72, 0.76$
	$^{105}\text{Zr}^{105}$	2.80	95 908			
	$^{106}\text{Zr}^{106}$		96 9107		17h	$\beta^- 1.91, (0.45)$ [to $^{106\text{m}}\text{Nb}$]; (γ)
	$^{107}\text{Zr}^{107}$				1m	β^-
Niobium	$^{93}\text{Nb}^{93}$		88 9126		1.9h	$\beta^+ 2.9$
	$^{94\text{m}}\text{Nb}^{94\text{m}}$				0.8h	β^+
	$^{95}\text{Nb}^{95}$		89 9109		14.6h	EC, $\beta^+ 1.50, (0.65)$; $\gamma 0.133-2.3$
	$^{96\text{m}}\text{Nb}^{96\text{m}}$				24s	IT $\gamma e^- 0.12$
	$^{97\text{m}}\text{Nb}^{97\text{m}}$				0.01s	IT $\gamma 0.25$ [to $^{97\text{m}}\text{Nb}$]
	$^{98}\text{Nb}^{98}$		90 9070		long	EC
	$^{99\text{m}}\text{Nb}^{99\text{m}}$				62d	IT $e^-(\gamma) 0.104$; (EC; γ)
	$^{100}\text{Nb}^{100}$		91 9068		10.1d	EC; $\gamma 0.93$ (others); (β^+)
	$^{101\text{m}}\text{Nb}^{101\text{m}}$				$\sim 10^7\text{y}$	
	$^{102}\text{Nb}^{102}$	100	92 9060	9/2		
	$^{103\text{m}}\text{Nb}^{103\text{m}}$				3.7y	IT $e^-(\gamma) 0.029$
	$^{104}\text{Nb}^{104}$		93 9070		$2.0 \times 10^4\text{y}$	$\beta^- 0.50$; $\gamma 0.70, 0.87$
	$^{105\text{m}}\text{Nb}^{105\text{m}}$				6.6m	IT $e^-(\gamma) 0.042$; (β^- ; γ)
	$^{106}\text{Nb}^{106}$		94 9067		35.1d	$\beta^- 0.16$; $\gamma 0.77$
	$^{107\text{m}}\text{Nb}^{107\text{m}}$				90h	IT $e^-(\gamma) 0.235$
	$^{108}\text{Nb}^{108}$		95 9079		24h	$\beta^- 0.69$; $\gamma 0.77, 0.56, 1.18$, others
	$^{109}\text{Nb}^{109}$		96 9078		72m	$\beta^- 1.27$; $\gamma 0.67, (1.02)$
	$^{110\text{m}}\text{Nb}^{110\text{m}}$				60s	IT $\gamma (e^-) 0.75$

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Molybdenum	Nb ⁹³				51m	β^- 2.6, 3.5; γ 0.78, 0.72 (others 0.3-2.7)
	Nb ⁹⁴				2.5m	β^- 3.2; γ 0.10, 0.26
	Nb ⁹⁵				10s	
	Nb ¹⁰⁰				12m	β^- 3.1, 3.5; γ 0.63, 0.62
	Nb ¹⁰¹				1.0m	β^-
	⁹² Mo		89.9136		6h	EC; β^+ 1.2 (to 0.01s Nb ^{92m}); β^+ 3.3 (to Nb ⁹¹)
	⁹¹ Mo		90.9117		15.5m	IT γ (e ⁻) 0.65; β^+ 2.5, 2.8; γ 1.2, 1.5; (EC) (to Nb ^{91m})
	^{91m} Mo				65s	
	⁹² Mo	15.84	91.9063			
	⁹³ Mo		92.9065		>2y	EC
	^{93m} Mo		92.9091		6.9h	IT γ e ⁻ 0.264; γ 0.684, 1.48
	⁹⁴ Mo	9.04	93.9047	0		
	⁹⁵ Mo	15.72	94.9057	5/2		
	⁹⁶ Mo	16.53	95.9045	0		
	⁹⁷ Mo	9.46	96.9058	5/2		
Technetium	⁹⁸ Mo	23.78	97.9055			
	⁹⁸ Mo		98.9079		67h	β^- 1.23, 0.45 (to Tc ^{98m}); γ 0.740, 0.181 (m) (others)
	¹⁰⁰ Mo	9.63	99.9076			
	¹⁰¹ Mo		100.9089		14.6m	β^- 2.2, others; γ 0.19, 1.02, 2.08, others
	¹⁰² Mo				11.5m	β^- 1.2
	¹⁰³ Mo				70s	β^-
	¹⁰⁴ Mo				1.1m	β^-
	¹⁰⁵ Mo				40s	β^-
	⁹³ Tc				4.0m	β^+ 4.1; γ 1.54, 0.79, 0.33, 0.135, others
	⁹³ Tc		92.9099		2.7h	EC; β^+ 0.82; γ 1.35, 1.48 (others); (to Mo ⁹³)
	^{93m} Tc				44m	IT γ e ⁻ 0.39; EC (to Mo ⁹³); γ 2.7
	⁹⁴ Tc				4.9h	EC; (β^+); γ 0.87, 0.70, 0.85
	^{94m} Tc		93.9094		52m	β^+ 2.5; EC; γ 0.87, 1.85 (others); IT
	⁹⁵ Tc		94.9075		20h	EC; γ 0.77 (others)
	^{95m} Tc				60d	EC; γ 0.204, 0.584, 0.84 (others); (β^+ ; IT 0.04)
	⁹⁶ Tc		95.9077		4.3d	EC; γ 0.77, 0.84, 0.81, 1.12 (others)
Ruthenium	^{96m} Tc				52m	IT e ⁻ (γ) 0.034; (β^+ ; γ)
	⁹⁷ Tc		96.9059		2.6 $\times$ 10 ⁶ y	EC
	^{97m} Tc				90d	IT e ⁻ γ 0.097
	⁹⁸ Tc		97.907		1.5 $\times$ 10 ⁶ y	β^- 0.30; γ 0.77, 0.67
	⁹⁸ Tc		98.9064	9/2	2.1 $\times$ 10 ⁶ y	γ^- 0.29
	^{99m} Tc				6.0h	IT e ⁻ (γ) 0.0021; γ 0.140; (γ 0.142)
	¹⁰⁰ Tc		99.9066		16s	β^- 3.4 (others); (γ)
	¹⁰¹ Tc		100.9059		14.0m	β^- 1.3, (1.1); γ 0.307 (others 0.13-0.94)
	¹⁰² Tc		101.9081		5s	β^- 4.1
	¹⁰² Tc				4.5m	β^- 2; γ 0.47, 0.63, 1.07, 1.77, 1.98
	¹⁰³ Tc				50s	β^- 2.0, 2.2; γ 0.135, 0.215, 0.35
	¹⁰⁴ Tc				18m	β^- 1.8-5.3; γ 0.36-4.7
	¹⁰⁵ Tc				7.7m	β^- 3.5; γ 0.11
	⁹⁸ Ru				52s	β^+
	⁹⁸ Ru				~57m	
Ruthenium	⁹⁸ Ru		94.9099		1.65h	EC; β^+ 1.2; γ 0.34, 1.4, 0.64, 0.15; (to 20h Tc ⁹⁸)
	⁹⁶ Ru	5.51	95.90759			
	⁹⁷ Ru				2.9d	EC; γ 0.216 (others); (to Tc ⁹⁷)
	⁹⁸ Ru	1.87	97.90528			

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Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Ru ⁹⁹	12.72	98.90593	5/2		
Ru ¹⁰⁰	12.62	99.90421			
Ru ¹⁰¹	17.07	100.90557	5/2		
Ru ¹⁰²	31.61	101.90434			
Ru ¹⁰²		102.9063		40d	β^- 0.21 (others); γ 0.498 (others 0.05–0.61); [to Rh ^{102m}]
Ru ¹⁰⁴	18.58	103.90543			
Ru ¹⁰⁵		104.90768		4.44h	β^- 1.15, 1.08 (others); γ 0.73, 0.48, 0.67, 0.32 (others)
Ru ¹⁰⁶		105.90733		1.0y	β^- 0.040; [to 30s Rh ¹⁰⁶]
Ru ¹⁰⁷				4.2m	β^- 4.6; γ 0.195, 0.37, 0.48, 0.86 (others)
Ru ¹⁰⁸				4.6m	β^- 1.3; γ 0.185
Rhodium					
⁴⁵ Rh ⁹⁶				~11m	
Rh ⁹⁷				35m	β^+ 2.1; γ 0.19, 0.26, 0.42
Rh ⁹⁸		97.910		8.7m	β^+ 2.5; γ 0.65
Rh ⁹⁹		98.90818		16d	EC; γ 0.35, 0.090, 0.18, 0.53 (others); (β^+)
Rh ⁹⁹				4.7h	EC; γ 0.33, 0.61 (others); (β^+)
Rh ¹⁰⁰		99.90812		21h	EC; γ 0.54, 2.38, 0.82, 1.58, others; (β^+)
Rh ¹⁰¹				~7y	EC; γ 0.195, 0.125
Rh ^{101m}				4.5d	EC; γ 0.31 (others); (IT 0.15)
Rh ¹⁰²		101.9068		210d	EC; β^- 1.15; β^+ 1.28; γ 0.475 (others)
Rh ^{102m}				~2.5y	EC; γ
Rh ¹⁰²	100	102.90551	1/2	57m	IT e^- (γ) 0.040
Rh ^{103m}				42s	β^- 2.4; (γ)
Rh ¹⁰⁴		103.9066		4.4m	IT e^- (γ) 0.077; γe^- 0.051; (γ ; β^-)
Rh ¹⁰⁶		104.90567		36h	β^- 0.56, 0.25; γ 0.32 (others)
Rh ^{106m}				30s	IT e^- γ 0.130
Rh ¹⁰⁸		105.90728		30s	β^- 3.54 (others); γ 0.513, 0.624 (others)
Rh ^{108m}				2.2h	β^- 0.79, 0.95, 1.18, 1.62; γ 0.513, others 0.22–1.22
Rh ¹⁰⁷		106.9067		22m	β^- 1.2; γ 0.307, 0.365 (others)
Rh ¹⁰⁸				17s	β^- 4.0; γ 0.43, 0.62 (others)
Rh ¹⁰⁹				~30s	β^- ; γ 0.32, 0.49
Rh ^{109m}				50s	IT 0.11
Rh ¹¹⁰				~3s	β^-
Palladium					
⁴⁶ Pd ⁹⁸				17m	EC
Pd ⁹⁹		98.9124		22m	β^+ 2.0; EC; γ 0.14, 0.42, 0.67, 0.28
Pd ¹⁰⁰				4.1d	EC; γ 0.081
Pd ¹⁰¹				8.5h	EC; γ 0.29, 0.59 (others); (β^+)
Pd ¹⁰²	0.96	101.90582			
Pd ¹⁰³		102.90611		17d	EC; γ 0.053 (others)
Pd ¹⁰⁴	10.97	103.90398			
Pd ¹⁰⁵	22.23	104.90507	5/2		
Pd ¹⁰⁶	27.33	105.90348			
Pd ¹⁰⁷		106.90512		7×10^4 y	β^- 0.035 [to stable Ag ¹⁰⁷]
Pd ^{107m}				21s	IT γe^- 0.22
Pd ¹⁰⁸	26.71	107.90388			
Pd ¹⁰⁹		108.90595		13.6h	β^- 1.03 [to Ag ^{109m}]; (γ)
Pd ^{109m}				4.7m	IT γe^- 0.18
Pd ¹¹⁰	11.81	109.90516			
Pd ¹¹¹		110.90766		22m	β^- 2.13 [to Ag ^{111m}]; (γ)
Pd ^{111m}				5.5h	IT e^- γ 0.17; β^- ; (γ 1.69)
Pd ¹¹²		111.9075		21h	β^- 0.28; e^- γ 0.018

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Silver	Pd^{112}				1.4m	β^-
	Pd^{114}				2.4m	β^-
	Pd^{116}				45a	β^-
	$^{47}\text{Ag}^{102}$				13m	β^+ 2.2; γ 0.55, 0.72 (others)
	Ag^{103}		102.9078	7/2	1.1h	EC; β^+ 1.2; γ 0.15, 0.11
	Ag^{103m}				5.7s	IT $e^- \gamma$ 0.135
	Ag^{104}		103.90857	5	67m	EC; β^+ 0.99; γ 0.56, 0.77, 0.94, others
	Ag^{104m}			2	29m	β^+ 2.70; γ 0.56; IT 0.02; EC
	Ag^{105}		104.9068	1/2	40d	EC; γ 0.35, 0.28, others 0.064-1.09
	Ag^{106}		106.9067	1	24m	β^+ 1.95, (1.45); γ 0.51, others 0.21-1.8; EC;
						(β^-)
	Ag^{106m}			6	8.3d	EC; γ 0.51, others 0.22-2.63
	Ag^{107}	51.35	106.90508	1/2		
	Ag^{107m}				44s	IT $e^- (\gamma)$ 0.093
	Ag^{108}		107.90594		2.4m	β^- 1.65; (EC; γ ; β^+)
	Ag^{108m}				>5y	EC; γ 0.72, 0.62, 0.43; (IT 0.031; γ 0.081)
	Ag^{109}	48.65	108.90475	1/2		
	Ag^{109m}				41s	IT $e^- (\gamma)$ 0.088
	Ag^{110}		109.90609		24s	β^- 2.87, (2.21); (γ)
	Ag^{110m}			6	253d	β^- 0.085, 0.53; γ 0.44-2.46; (IT 0.116)
	Ag^{111}		110.90531	1/2	7.5d	β^- 1.05; (γ)
	Ag^{111m}				1.2m	IT 0.065
	Ag^{112}		111.9071	2	3.2h	β^- 4.0, 3.4 (others); γ 0.62 (others)
	Ag^{113}		112.9065	1/2	5.3h	β^- 2.0; (γ 0.12-1.18)
	Ag^{113m}				1.2m	IT; β^- ; γ 0.14-0.70
	Ag^{114}		113.9085		5a	β^- 4.6; γ 0.57
	Ag^{114m}				2m	β^-
	Ag^{115}		114.9087		21m	β^- 2.9; (γ)
	Ag^{115m}				20s	β^- [to 2.3d Cd^{115}]
	Ag^{116}				2.5m	β^- 5.0; γ 0.52, 0.70
	Ag^{117}				1.1m	β^-
Cadmium	$^{48}\text{Cd}^{102}$				10m	β^+ ; γ 0.22, 0.62, 0.85
	Cd^{104}				57m	EC; γ 0.084 (others)
	Cd^{106}				55m	β^+ 0.80, 1.69; γ 0.025-2.3
	Cd^{108}	1.22	105.90646			
	Cd^{107}		106.90661	5/2	6.7h	EC [to Ag^{107m}]; (γ 0.85; β^+)
	Cd^{108}	0.87	107.90418			
	Cd^{109}		108.90492	5/2	470d	EC [to Ag^{109m}]
	Cd^{110}	12.39	109.90300			
	Cd^{111}	12.75	110.90418	1/2		
	Cd^{111m_1}				49m	IT $e^- \gamma$ 0.150; γ 0.247 (m)
	Cd^{112}	24.07	111.90275			
	Cd^{113}	12.26	112.90440	1/2		
	Cd^{113m}		112.9049		14y	β^- 0.58; (IT)
	Cd^{114}	28.86	113.90336			
	Cd^{115}		114.90542		2.3d	β^- 1.11, 0.59; γ 0.523, 0.490 (others) [to In^{115m}]
	Cd^{115m}			11/2	43d	β^- 1.63 (others); (γ); [to In^{115}]
	Cd^{116}	7.58	115.90476			
	Cd^{117}		116.9074		50m	β^- 1.8, 2.3; γ 0.425; [to 1.9h In^{117m}]
Indium	Cd^{117}		116.9074		2.9h	β^- 1.0; γ 0.27-2.2
	Cd^{118}				50m	β^- 0.8; [to 5s In^{118}]
	Cd^{119}				2.7m	β^- ; [to 2.3m In^{119}]
	Cd^{119}				11m	β^- 3.5; [to 18m In^{119m}]
	$^{49}\text{In}^{106}$				5.3m	β^+ 4.9, 2.7; γ 0.63, 0.86, 1.66, 0.99 (others)
	In^{107}				30m	$\beta^+ \sim 2$; γ 0.22

TABLE OF NUCLIDES

Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
In^{108}		107.9097		57m	EC; β^+ 1.3; γ 0.15-1.05
In^{108m}				40m	β^+ 3.50, 2.66; γ 0.63, 0.84; EC
In^{109}		108.90709	9/2	4.3h	EC; γ 0.21, 0.63 (others); (β^+)
In^{109m}				1.3m	IT $\gamma(e^-)$ 0.66
In^{110}		109.9072		66m	β^+ 2.25; γ 0.66 (others); EC
In^{110m}			7	4.9h	EC; γ 0.94, 0.88, 0.66 (others)
In^{111}		110.9055	9/2	2.82d	EC; γ 0.173, 0.246
In^{111m}				$\sim 10m$	IT γ 0.53
In^{112}		111.90552		14m	β^- 0.66; EC; β^+ 1.62; (γ 0.82)
In^{112m_1}				21m	IT 0.155
In^{112m_2}				0.04s	IT 0.31
In^{112}	4.28	112.90411	9/2		
In^{112m}			1/2	1.73h	IT γe^- 0.393
In^{114}		113.90489		72s	β^- 1.98; (EC; β^+ ; γ)
In^{114m_1}			5	50d	IT $e^- \gamma$ 0.191; (EC; γ)
In^{114m_2}				2.5s	IT 0.15
In^{115}	95.72	114.90386	9/2	$5 \times 10^{14}y$	β^- 0.48
In^{115m}			1/2	4.5h	IT γe^- 0.336; (β^- 0.84)
In^{116}		115.9053		14s	β^- 3.3; (γ)
In^{116m_1}			5	54m	β^- 1.00, 0.87, 0.60; γ 1.27, 1.09, 0.41, 0.82, 2.09 (others)
In^{116m_2}				2.2s	IT $e^- \gamma$ 0.16; [to In^{116m_1}]
In^{117}		116.90452	9/2	38m	β^- 0.74; γ 0.56, 0.16; [to stable Sn^{117}]
In^{117m}			1/2	1.9h	β^- 1.77, 1.62; IT $e^- \gamma$ 0.31; γ 0.16 (others)
In^{118}		117.9063		5s	β^- 4.2, 3.0; γ 1.22
In^{118m}				4.4m	β^- 1.3, 2.1; γ 1.22, 1.04, 0.69, 0.8, 0.45, 0.21
In^{119}		118.9059		2m	β^- 1.6; γ 0.82, (0.71)
In^{119m}				18m	β^- 2.7, 1.8; γ 0.91; (IT 0.3)
In^{120}				3s	β^- 5.6
In^{120m}				44s	β^- 2.0, 3.3, 4.0; γ 1.02, 1.18, 0.87, others
In^{121}				30s	β^- ; γ 0.94
In^{121}				3.1m	β^- 3.7
In^{122}				7.5s	β^- 4.5; γ 1.14, 1.00
In^{123}				10s	β^- ; γ 1.10
In^{123}				36s	β^- 4.6
In^{124}				3s	β^- 5.2; γ 1.35, 1.00
Tin	$^{10}\text{Sn}^{108}$			9m	EC
	Sn^{109}			18m	EC; $\beta^+ \sim 1.5$, > 2.5 ; γ 0.34, 1.12, 0.52, 0.89
	Sn^{110}			4.0h	EC; γ 0.283; [to 66m In^{110}]
	Sn^{111}	110.9082		35m	EC; β^+ 1.5
	Sn^{112}	111.90481			
	Sn^{112}	112.90484		118d	EC; (γ 0.255); [to 1.4h In^{112m}]
	Sn^{112m}			27m	IT $e^- \gamma$ 0.079
	Sn^{114}	113.90276			
	Sn^{116}	114.90335	1/2		
	Sn^{116}	115.90174	0		
	Sn^{117}	116.90294	1/2		
	Sn^{117m}			14d	IT $e^- (\gamma)$ 0.159; $\gamma(e^-)$ 0.161
	Sn^{118}	117.90160	0		
	Sn^{119}	118.90330	1/2		
	Sn^{119m_1}			250d	IT $e^- (\gamma)$ 0.065; $e^- (\gamma)$ 0.024 (m_1)
	Sn^{120}	119.90219	0		
	Sn^{121}	120.90424		27h	β^- 0.38
	Sn^{121m}			$\sim 25y$	β^- 0.42
	Sn^{122}	121.90343			
	Sn^{122}	122.90574		41m	β^- 1.26; γ 0.15

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Antimony	^{123}Sn	5.94	123.90526 124.90776		125d	β^- 1.42, (0.34); (γ 1.08)
	^{124}Sn				9.5d	β^- 2.33 (others); (γ 0.23-1.97)
	^{125m}Sn				9.7m	β^- 2.04 (others); (γ 0.33-1.4)
	^{126}Sn				$2 \times 10^4\text{y}$	β^- ; γ 0.06, 0.067, 0.092
	^{127}Sn				2.1h	β^- ; γ 1.10, 0.82
	^{127m}Sn				4m	
	^{128}Sn				59m	β^- 0.80, 0.73; γ 0.50, 0.57, 0.072, 0.04
	^{129}Sn				1.0h	β^-
	^{129m}Sn				8.8m	
	^{130}Sn				2.6m	β^-
	^{131}Sn				3.4m	β^-
	^{131m}Sn				1.6h	
	^{132}Sn				2.2m	β^-
	^{113}Sb	57.25	113.9097 114.9068 115.9070		0.9m	β^+ ; γ 1.27
	^{113m}Sb				7m	β^+ 1.85, 2.42
	^{114}Sb				3.4m	β^+ 2.7, 4.0; γ 0.90, 1.30
	^{115}Sb				30m	EC; β^+ 1.5; γ 0.50
	^{116}Sb				15m	EC; β^+ 1.5, 2.3; γ 1.30, 0.90, 2.22
	^{116m}Sb				60m	EC; β^+ 1.45; γ 1.29, 0.90, 0.40, 0.14, 0.11, 2.23
	^{117}Sb				2.8h	EC; γ 0.161; (β^+); [to stable ^{117}Sn]
	^{118}Sb				5h	EC; γ 1.03, 1.22, 0.26, 0.040 (m)
	^{118m}Sb				3.5m	β^+ 2.60; EC; (γ)
	^{119m}Sb				0.6m	γ 0.14, 0.30, 0.33
	^{119}Sb				38h	EC; β^- γ 0.024 (m)
	^{120}Sb				16m	EC; β^+ 1.70; (γ)
	^{120m}Sb				5.8d	EC; γ 0.089 (m), 0.20, 1.04, 1.18
	^{121}Sb			5/2		
	^{122}Sb				2.74d	β^- 1.40, 1.97; γ 0.564 (others); (EC; β^+)
	^{122m}Sb	42.75	122.90421 123.90595	7/2	4.2m	IT ϵ^- (γ) 0.026; γ 0.077 (m_2), 0.061 (m_1)
	^{123}Sb					
	^{124}Sb				60d	β^- 0.62, 2.31, 0.23; γ 0.603, 1.69 (others 0.63-2.3)
	^{124m}Sb				1.5m	IT ϵ^- (γ) 0.010; β^- 1.19; γ 0.51, 0.65, 0.60
	$^{124m_2}\text{Sb}$				21m	IT ϵ^- (γ) 0.025
	^{125}Sb				2.7y	β^- 0.30, 0.12, 0.62; γ 0.035, 0.67
	^{126}Sb				12.5d	β^- 1.9, others; γ 0.29-0.99
	^{126m}Sb				19m	β^- 1.9; γ 0.415, 0.665, 0.696; IT $\leq$ 0.03
	^{127}Sb				3.9d	β^- 0.80, 1.5, 1.1, 0.86; γ 0.46, 0.77, 0.25 (others)
	^{128}Sb				8.6h	β^- 1.0; γ 0.16-1.18
	^{128m}Sb				11m	β^- 2.5, 2.8; γ 0.32, 0.75
	^{129}Sb				4.6h	β^- 1.87, others; γ 0.53, 0.16, 0.31, 0.79
Tellurium	^{130}Sb	57.25	120.90381 121.90517	5/2	33m	β^- ; γ 0.19, 0.33, 0.82, 0.94
	^{130m}Sb				7m	γ 0.20, 0.82 (others)
	^{131}Sb				23m	β^-
	^{132}Sb				2m	β^-
	^{133}Sb				2.4m	β^-
	^{134}Sb				0.8m	β^-
	^{114}Te	115.9087	115.9087	0	16m	
	^{115}Te				6m	
	^{116}Te				2.5h	EC; (β^+); γ 0.094; [to ^{116}Sb]
	^{117}Te				1.0h	EC; β^+ 1.74; γ 0.72 (others)

TABLE OF NUCLIDES

Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Te^{118}				6.0d	EC; [to 3.5m $\text{Sb}^{118\text{m}}$]
Te^{119}		118.90638	1/2	16h	EC; γ 0.645, (1.76); (β^+)
$\text{Te}^{119\text{m}}$			11/2	4.6d	EC; γ 0.153, 1.22, 0.271, 0.93, 1.10 (others)
Te^{120}	0.089	119.90402		17d	EC; γ 0.575, 0.506, 0.070; (β^+)
Te^{121}				154d	IT $e^-(\gamma)$ 0.082; γ 0.213; (EC; γ)
Te^{122}	2.46	121.90305			
Te^{123}	0.87	122.90426	1/2	1.2×10^{13} y	EC
$\text{Te}^{123\text{m}}$				104d	IT $e^-(\gamma)$ 0.089; γe^- 0.159
Te^{124}	4.61	123.90281			
Te^{126}	6.99	124.90444	1/2	58d	IT $e^-(\gamma)$ 0.109; $e^-(\gamma)$ 0.036 (m_1)
$\text{Te}^{126\text{m}}$					
Te^{128}	18.71	125.90333		9.3h	β^- 0.70; (γ)
Te^{127}		126.90521		105d	IT $e^-(\gamma)$ 0.089; (β^- ; γ)
$\text{Te}^{127\text{m}}$					
Te^{128}	31.79	127.90449		72m	β^- 1.45, 0.99 (others); γ 0.027 (m), 0.47 (others)
Te^{129}		128.90657		33d	IT $e^-(\gamma)$ 0.106; β^-
$\text{Te}^{129\text{m}}$					
Te^{130}	34.48	129.90623		25m	β^- 2.14, 1.68 (others); γ 0.148, 0.45 (others)
Te^{131}		130.90657		1.2d	β^- 0.42, 0.57 (others); IT $e^- \gamma$ 0.182; γ 0.78, 0.84, 1.14, others
$\text{Te}^{131\text{m}}$					
Te^{132}		131.90854		77h	β^- 0.22; γ 0.23, 0.053
Te^{133}				~ 2 m	$\beta^- \sim 2.4$; γ
$\text{Te}^{133\text{m}}$				53m	β^- 1.3, 2.4; γ 0.31-0.97; IT 0.334
Te^{134}				42m	$\beta^- \sim 1.2$; γ 0.20, 0.26, 0.17, 0.08
Te^{135}				1.4m	β^-
Iodine				10m	
				17m	
				19m	β^+ ; EC; γ
				1.4h	β^+ 4.0; EC
				2.1h	EC; β^+ 1.13; γ 0.21, others
				3.5m	β^+ 3.1; EC
		121.9074		13h	EC; γ 0.159 (others)
		123.90622	5/2	4.2d	EC; β^+ 1.55, 2.15; γ 0.603, 1.69, 0.65 (others)
			2		EC; $e^-(\gamma)$ 0.035 (m) [to stable Te^{123}]
		124.90460	5/2	60d	EC; β^- 0.87 (others); (β^+); γ 0.665, 0.386 (others)
		125.90563	2	13.1d	
		126.90447	5/2		β^- 2.12, 1.66; γ 0.45 (others); (EC)
		127.90583	1	25.0m	β^- 0.15; $e^-(\gamma)$ 0.038
	100	128.90498	7/2	1.6×10^7 y	β^- 0.60, 1.02; γ 0.53, 0.67, 0.74, 0.42, 1.15
		129.90667	5	12.5h	β^- 0.60 (others); γ 0.364 (others)
		130.90612	7/2	8.06d	β^- 0.80, 1.04, 1.61, 2.14 (others); γ 0.673, 0.78, others 0.24-2.7
		131.90800	4	2.29h	β^- 1.22 (others); γ 0.53 (others)
		132.9075	7/2	21h	β^- 2.41, 1.25, others; γ 0.85, 0.89 (others 0.14-1.8)
		133.90984		53m	β^- 1.0, 1.4, 0.5; γ 0.14-2.0
			7/2	6.7h	β^- 4.2, 5.6, 2.7, 7.0; γ 1.32, others 0.20-3.2
		135.9147		84m	

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Xenon	I^{137}				24s	β^- ; γ 0.39; (n)
	I^{138}				6s	β^- ; (n)
	I^{139}				2s	β^- ; (n)
	^{131}Xe				40m	β^+ 2.77; EC; γ 0.096, 0.08, 0.13, 0.44
	Xe^{132}				19h	EC; γ 0.090, 0.148, 0.239
	Xe^{133}				1.8h	EC; β^+ 1.51; γ 0.148, 0.178, 0.33
	Xe^{134}	0.096	123.9061		18h	EC; γ 0.055, 0.075, 0.113, 0.188, 0.242 (others)
	Xe^{136}				55s	IT; γ 0.111, 0.075
	Xe^{135m}				36.4d	EC; γ 0.203, 0.173, 0.37 (others)
	Xe^{136}	0.090	125.90417		75s	IT $e^- \gamma$ 0.175; γ 0.125
	Xe^{137}		126.9051			
	Xe^{137m}					
	Xe^{138}	1.919	127.90353			
	Xe^{139}	26.44	128.90478	1/2		
	Xe^{139m}				8.0d	IT $e^- (\gamma)$ 0.196; $e^- \gamma$ 0.040
	Xe^{130}	4.08	129.90350			
	Xe^{131}	21.18	130.90508	3/2		
	Xe^{131m}				12d	IT $e^- (\gamma)$ 0.163
	Xe^{132}	26.89	131.90416			
	Xe^{133}		132.9055		5.27d	β^- 0.34; $e^- \gamma$ 0.081 (m); (γ)
	Xe^{133m}				2.3d	IT $e^- \gamma$ 0.233
	Xe^{134}	10.44	133.90539			
	Xe^{135}		134.9070		9.2h	β^- 0.91; γ 0.25 (others)
	Xe^{135m}				15.7m	IT γe^- 0.53
	Xe^{136}	8.87	135.90721			
	Xe^{137}				3.9m	β^- 3.5; γ 0.26, 0.45
	Xe^{138}				17m	β^- 2.4; γ 0.42, 0.51, 1.78, 2.01
	Xe^{139}				41s	$\beta^- \sim 3.5, \sim 4.6$; γ 0.22, 0.30, 0.17, 0.40
	Xe^{140}				16s	β^-
	Xe^{141}				1.7s	β^-
	Xe^{142}				$\sim 1.5s$	β^-
	Xe^{143}				1s	β^-
	Xe^{144}				1s	β^-
Cesium	^{133}Cs				8m	β^+
	Cs^{135}				45m	β^+ 2.05; EC; γ 0.112
	Cs^{136}		125.9093		1.6m	β^+ 3.8; γ 0.38, 0.48; EC
	Cs^{137}		126.9073	1/2	6.2h	EC; γ 0.406, 0.125 (others); (β^+)
	Cs^{138}		127.90773		3.8m	β^+ 2.89, 2.45; γ 0.44 (others); EC
	Cs^{139}			1/2	32h	EC; γ 0.37, 0.41 (others), $e^- (\gamma)$ 0.040
	Cs^{130}		129.90672	1	30m	EC; β^+ 1.97; (β^-)
	Cs^{131}		130.90547	5/2	9.69d	EC
	Cs^{132}		131.9061	2	6.48d	EC; γ 0.668 (others); (β^- ; β^+)
	Cs^{133}	100	132.9051	7/2		
	Cs^{134}		133.9065	4	2.1y	β^- 0.66, 0.086 (others); γ 0.605, 0.80, 0.57 (others)
	Cs^{134m}			8	2.90h	IT $e^- \gamma$ 0.128; $e^- (\gamma)$ 0.010; (β^-)
	Cs^{136}		134.9058	7/2	$2.0 \times 10^4\text{y}$	β^- 0.21
	Cs^{136m}				53m	IT $\gamma (e^-)$ 0.84; γ 0.76
	Cs^{138}		135.9071	5	12.9d	β^- 0.34, (0.66); γ 0.33, 1.07, others 0.067-1.26
	Cs^{137}		136.9068	7/2	30y	β^- 0.51, (1.18)
	Cs^{138}		137.9102		32m	β^- 1.5-3.4; γ 1.43, 1.01, 0.46, 2.21 (others)
	Cs^{139}		138.9132		9.5m	β^- 4; γ 1.28, 0.63
	Cs^{140}				1.1m	β^- ; γ 0.61
	Cs^{141}				25s	β^-
	Cs^{142}				$\sim 1\text{m}$	β^-

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Barium	¹³² Ba				2m	
	Ba ¹³⁵				6.5m	
	Ba ¹³⁶				96m	EC; γ 0.225, 0.70
	Ba ¹³⁷				11m	β^+
	Ba ¹³⁸				2.4d	EC
	Ba ¹³⁹				2.1h	EC; γ 0.05-1.62
	Ba ^{139m}				2.6h	EC; β^+ 1.43; γ
	Ba ¹⁴⁰	0.101	129.90625			
	Ba ¹⁴¹				11.6d	EC; γ 0.055-1.7
	Ba ^{141m}				14.6m	IT $e^-(\gamma)$ 0.073; $\gamma(e^-)$ 0.107
	Ba ¹⁴²	0.097	131.9051			
	Ba ¹⁴³		132.9056		7.2y	EC; γ 0.355, 0.081, 0.302 (others)
	Ba ^{143m}				39h	IT $e^-\gamma$ 0.276; $e^-(\gamma)$ 0.012
	Ba ¹⁴⁴	2.42	133.9043			
	Ba ¹⁴⁵	6.59	134.9056	3/2		
	Ba ^{145m}				29h	IT $e^-\gamma$ 0.268
	Ba ^{146m}				0.33m	IT?; γ 0.80, 0.70
	Ba ¹⁴⁶	7.81	135.9044			
	Ba ¹⁴⁷	11.32	136.9056	3/2		
	Ba ^{147m}				2.6m	IT γe^- 0.662
	Ba ¹⁴⁸	71.66	137.9050			
	Ba ¹⁴⁹		138.9066		82.9m	β^- 2.34, 2.17 (others); γ 0.165 (others)
	Ba ¹⁴⁹					β^- 1.01, 0.5 (others); γ 0.030, 0.54 (others)
	Ba ¹⁴⁹					β^- 2.8 (others); γ 0.19, 0.29, 0.35, 0.46, 0.64 (others)
	Ba ¹⁴⁹					$\beta^- \sim 4$; γ 0.08-1.8
	Ba ¹⁴⁹					β^-
Lanthanum	¹³⁸ La				<1m	
	La ¹³⁶				1.0m	β^+ ; γ 0.26
	La ¹³⁷				3.8m	
	La ¹³⁸				4.2m	β^+ ; γ 0.28
	La ¹³⁹				7m	
	La ¹⁴⁰				9m	β^+ ; γ 0.36
	La ¹⁴¹				60m	EC; β^+ 1.43, 1.94, 0.70; γ 0.11-0.88
	La ¹³²		131.9103		4.5h	$\beta^+ \sim 3.8$; γ 1.0-3.3
	La ¹³³		132.9080		4.0h	EC; β^+ 1.2; γ 0.8
	La ¹³⁴		133.9083		6.5m	EC; β^+ 2.7; γ 0.60
	La ¹³⁵		134.9067		19.8h	EC; (γ)
	La ¹³⁶		135.9074		10m	EC; β^+ 1.8; (γ 0.83)
	La ¹³⁷				6×10^4 y	EC
	La ¹³⁸	0.089	137.9068	5	1.1×10^{11} y	EC; γ 1.43; β^- 0.20; γ 0.81
	La ¹³⁹	99.911	138.9061	7/2		
	La ¹⁴⁰		139.9093	3	40.2h	β^- 1.34, others 0.42-2.20; γ 1.60, 0.49, 0.82, 0.33 (others)
	La ¹⁴¹		140.9106		3.8h	β^- 2.4; (γ)
	La ¹⁴²				92m	β^- 4.0, others; γ 0.63, 2.4, others 0.87-3.4
	La ¹⁴³		142.9157		14m	β^- 3.3; γ 0.20-2.85
Cerium	¹³⁷ Ce				10m	EC; (β^+ ; γ)
	Ce ¹³²				4.2h	β^+
	Ce ¹³³				6.3h	EC; β^+ 1.3; γ 1.8
	Ce ¹³⁴				72h	EC
	Ce ¹³⁵				22h	EC; (β^+); γ 0.28
	Ce ¹³⁶	0.193	135.9071			
	Ce ¹³⁷				8.7h	EC; $e^-(\gamma)$ 0.010 (m); (γ)
	Ce ^{137m}				34.5h	IT $e^-\gamma$ 0.255; (EC; γ)
	Ce ¹³⁸	0.250	137.9057			
	Ce ^{139m}				0.009s	IT 0.30; γ 1.04, 0.80
	Ce ¹³⁹		138.9063		140d	EC; γ 0.166 (m)
	Ce ^{139m}				55s	IT $\gamma(e^-)$ 0.74
	Ce ¹⁴⁰	88.48	139.90528			
	Ce ¹⁴¹		140.90801	7/2	32.5d	β^- 0.44, 0.58; γ 0.145

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
	Ce ¹⁴²	11.07	141.9090		$\sim 5 \times 10^{15}$ y 33h	α 1.5
	Ce ¹⁴³		142.91217			β^- 1.09, 1.38, others; γ 0.20, 0.057 (m), others 0.23- 1.10
	Ce ¹⁴⁴		143.91343		284d	β^- 0.32, 0.19; γ 0.133 (others)
	Ce ¹⁴⁶		144.9162		3.0m	β^- 2.0
	Ce ¹⁴⁸		145.9183		14m	β^- 0.70; γ 0.32, 0.22, 0.14, 0.11 (others)
	Ce ¹⁴⁷				1.1m	β^-
	Ce ¹⁴⁸				0.7m	β^-
Praseody- mium	⁸⁹ Pr ¹³⁴				40m	γ 0.72
	Pr ¹³⁵				22m	β^+ 2.5; γ 0.08, 0.22, 0.30
	Pr ¹³⁶				1.1h	EC; β^+ 2.0; γ 0.17 (others)
	Pr ¹³⁷				1.5h	EC; β^+ 1.7
	Pr ¹³⁸				2.1h	EC; β^+ 1.4; γ 0.30, 0.80, 1.04 (others)
	Pr ¹³⁹		138.9085		4.5h	EC; β^+ 1.0; γ 1.3, 1.6
	Pr ¹⁴⁰		139.90878		3.5m	EC; β^+ 2.4; γ 1.2
	Pr ¹⁴¹	100	140.90739	5/2		
	Pr ¹⁴²		141.90979	2	19.2h	β^- 2.15; (γ 1.57)
	Pr ¹⁴³		142.91083	7/2	13.7d	β^- 0.93
	Pr ¹⁴⁴		143.91310		17.3m	β^- 2.98; (γ)
	Pr ¹⁴⁶		144.9141		0.0h	β^- 1.80; γ 0.07-1.15
	Pr ¹⁴⁶		145.9172		25m	β^- 3.8, 2.3; γ 0.45, 1.49, 0.75 (others)
	Pr ¹⁴⁷				12m	β^- ; γ 0.32, 0.58, 0.64, 0.92, 1.25
	Pr ¹⁴⁸				2m	β^- ; γ 0.30
Neodymium	⁸⁹ Nd ¹²⁸				22m	β^+ 2.4; γ
	Nd ¹²⁹				5.5h	EC; β^+ ; γ 1.3
	Nd ¹⁴⁰				3.3d	EC; γ 0.11-0.50
	Nd ¹⁴¹		140.90932	3/2	2.5h	EC; (β^+ 0.78); (γ)
	Nd ^{141m}				63s	IT $\gamma(e^-)$ 0.76
	Nd ¹⁴²	27.11	141.90748			
	Nd ¹⁴³	12.17	142.90982	7/2		
	Nd ¹⁴⁴	23.85	143.90990		2.4×10^{15} y	α 1.83
	Nd ¹⁴⁶	8.30	144.9122	7/2		
	Nd ¹⁴⁶	17.22	145.9127			
	Nd ¹⁴⁷		146.91583	5/2	11.1d	β^- 0.81, 0.37; γ 0.091 (m), 0.53 (others)
	Nd ¹⁴⁸	5.73	147.9165			
	Nd ¹⁴⁹		148.9198	5/2	1.8h	β^- 1.1, 1.5, 0.95; γ 0.114, 0.210, 0.240, 0.112 (others)
	Nd ¹⁵⁰	5.62	149.9207			
	Nd ¹⁵¹		150.9242		12m	β^- 2.0, 1.2, 1.8; γ 0.085-2.17
Promethium	⁶¹ Pm ¹⁴¹		140.9132		22m	β^+ 2.6; EC; γ 0.20
	Pm ^{141m}				0.0022s	IT γe^- 0.43; γ 0.19
	Pm ¹⁴²		141.9126		30s	β^+ 3.8; γ 1.6
	Pm ¹⁴³		142.9108		280d	EC; γ 0.742
	Pm ¹⁴⁴				~ 400 d	EC; γ 0.61, 0.70, 0.48
	Pm ¹⁴⁶		144.9123		18y	EC; γ 0.072, (0.067)
	Pm ¹⁴⁶		145.9145		1.9y	EC; β^- 0.78; γ 0.75, 0.45
	Pm ¹⁴⁷		146.91486	7/2	2.65y	β^- 0.225; (γ)
	Pm ¹⁴⁸		147.9171	1	5.4d	β^- 2.45, 0.99, 1.9; γ 0.55, 1.46, 0.91
	Pm ^{149m}			6	43d	β^- 0.39, 0.49, 0.68; γ 0.55, 0.63, 0.73, others; (IT)
	Pm ¹⁴⁹		148.9181	7/2	53h	β^- 1.07 (others); (γ)
	Pm ¹⁵⁰		149.9203		2.7h	β^- 2.3, 3.2; γ 0.33, others 0.41-3.08
	Pm ¹⁵¹		150.9216	5/2	28h	β^- 0.33-1.2; γ 0.10, 0.34, others 0.026-0.95
	Pm ¹⁵²				6m	β^- 2.2; γ 0.12 (m), 0.24, ~ 1
	Pm ¹⁵³				5.5m	β^- 1.65; γ 0.125, 0.18
	Pm ¹⁵⁴				2.5m	β^- 2.5

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Samarium	^{141}Sm				$\sim 20\text{d}$	EC
	^{142}Sm				72m	EC; β^+ 1.0; (γ)
	^{143}Sm		142.9145		8.7m	EC; β^+ 2.5; (γ)
	$^{143\text{m}}\text{Sm}$				1.1m	IT 0.75
	^{144}Sm	3.09	143.9116			
	^{145}Sm		144.9130		340d	EC; e^- (γ) 0.061 (m)
	^{146}Sm		145.9129		$5 \times 10^7\text{y}$	α 2.55
	^{147}Sm	14.97	146.91462	7/2	$1.1 \times 10^{11}\text{y}$	α 2.15
	^{148}Sm	11.24	147.9146			
	^{149}Sm	13.83	148.9169	7/2		
	^{150}Sm	7.44	149.9170			
	^{151}Sm		150.9197		$\sim 93\text{y}$	β^- 0.076; (γ)
	^{152}Sm	26.72	151.9195			
	^{153}Sm		152.9217	3/2	47h	β^- 0.70, 0.64, 0.80; γ 0.103, 0.070 (others)
	^{154}Sm	22.71	153.9220			
	^{155}Sm		154.9247		22m	β^- 1.53; γ 0.105 (others)
	^{156}Sm		155.9257		9.4h	β^- 0.43, 0.71; γ 0.087, 0.20, 0.185, (0.25)
	^{157}Sm				0.5m	β^- ; γ 0.57
Europium	^{144}Eu				18m	β^+ 2.4
	^{145}Eu				5.8d	EC; γ 0.89, 0.65, 0.23 (others); (β^+)
	^{148}Eu				4.4d	EC; (β^+); γ 0.75, 0.64, 0.71, 0.67 (others)
	^{147}Eu		146.9166		22d	EC; γ 0.12, 0.077, 0.20 (others); (α 2.88)
	^{148}Eu				54d	EC; γ 0.55, 0.63, others 0.24-2.19
	^{149}Eu				106d	EC; γ 0.022 (m), others to 0.558
	^{150}Eu		149.9196		12.5h	EC; γ 0.33-2.02
	^{150}Eu				>5y	EC; γ 0.334, 0.439 (others)
	^{151}Eu	47.82	150.9196	5/2		
	^{152}Eu		151.9215	3	12.5y	EC; β^- 0.71 (others); (β^+); γ 0.122 (m), 0.344, 1.41, 0.96, 1.11, 1.08, 0.78 (others)
	$^{152\text{m}}\text{Eu}$			0	9.3h	β^- 1.87 (others); EC; γ 0.122, 0.84 (others); (β^+)
	^{153}Eu	52.18	152.9209	5/2		
	^{154}Eu		153.9228	3	16y	β^- 0.25-1.85; γ 0.123 (m), others 0.25-1.60
	^{155}Eu		154.9228		1.81y	β^- 0.15-0.25; γ 0.019-0.14
	^{156}Eu		155.9247		15d	β^- 0.50, 2.45; γ 0.089-2.20
	^{157}Eu		156.9253		15h	β^- ~ 1.7 ; γ 0.041-0.73
	^{158}Eu				60m	β^- 2.65
	^{159}Eu				18m	β^- 2.2; γ 0.07-0.22
	^{160}Eu				2.5m	β^- ~ 3.6
Gadolinium	^{146}Gd				24m	EC; β^+ 2.5; γ 0.78, 1.05
	^{146}Gd				50d	EC; γ 0.11, 0.15, 0.07
	^{147}Gd				22h	EC; γ 0.23, 0.38, 0.94, 0.64, 0.78, 0.28 (others)
	^{148}Gd		147.9177		84y	α 3.18
	^{149}Gd		148.9189		9.5d	EC; γ 0.150, 0.35, 0.30, 0.75 (others); (α)
	^{150}Gd		149.9185		$2 \times 10^8\text{y}$	α 2.73
	^{151}Gd				120d	EC; γ 0.022-0.35
	^{152}Gd	0.200	151.9195		$1.1 \times 10^{14}\text{y}$	α 2.14
	^{153}Gd		152.9211		242d	EC; γ 0.103 (m), 0.070, 0.10 (others)
	^{154}Gd	2.15	153.9207			
	^{155}Gd	14.73	154.9226	3/2		
	^{156}Gd	20.47	155.9221			
	^{157}Gd	15.68	156.9239	3/2		
	^{158}Gd	24.87	157.9241			

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Terbium	Gd ¹⁵⁹		158.9260	3/2	18h	β^- 0.95, 0.89, 0.59; γ 0.058, 0.36 (others)
	Gd ¹⁶⁰	21.90	159.9271		3.7m	β^- 1.60, (1.54); γ 0.36, 0.057, 0.315, 0.102 (others)
	Gd ¹⁶¹		160.9293			β^- ; γ 0.04-1.39
	Gd ^{162?}				> 1y	
	⁶⁶ Tb ¹⁴⁷				24m	β^+ ; γ 0.31, 0.15
	Tb ¹⁴⁸				70m	β^+ 4.6; γ 0.78, 1.12
	Tb ¹⁴⁹				4.1h	EC; β^+ ; α 3.95; γ 0.35, 0.16 (others)
	Tb ^{149m}				4.3m	α 3.99; IT
	Tb ¹⁵⁰				3.1h	β^+ ; γ 0.64 (others)
	Tb ¹⁵¹		150.9230		18h	EC; γ 0.11-1.31; (α 3.44)
	Tb ¹⁵²				18h	EC; γ 0.12-1.05; (β^+)
	Tb ^{153m}				4m	EC; β^+ ; γ 0.24, 0.14; (α)
	Tb ¹⁵³				2.6d	EC; γ 0.016-0.99
	Tb ¹⁵⁴				21h	EC; β^+ 2.8; γ 0.123 (m), 0.24-2.48
	Tb ¹⁵⁴				8h	EC; γ 0.123-1.29
	Tb ¹⁵⁵				5.6d	EC; γ 0.019-0.72
	Tb ¹⁵⁶				5.4d	EC; γ 0.089-2.31
	Tb ^{156m}				5.5h	IT 0.088; (β^-)
	Tb ¹⁵⁷				> 30y	EC
	Tb ¹⁵⁸		157.9250		> 3y	EC; γ 0.04
	Tb ^{158m}				11s	IT e^- (γ) 0.11
Dysprosium	Tb ¹⁵⁹	100	158.9250	3/2		
	Tb ¹⁶⁰		159.9268	3	73d	β^- 0.27-1.71; γ 0.88, 0.30, 0.97, 0.087 (others)
	Tb ¹⁶¹		160.9272	3/2	6.9d	β^- 0.51, 0.45, 0.58; γ 0.049, 0.026, 0.057, 0.075 (others)
	Tb ^{162?}				2h	β^-
	Tb ¹⁶³				7m	β^- ; γ 0.18
	Tb ¹⁶⁴				23h	β^-
	⁶⁶ Dy ¹⁴⁸				~15m	EC; γ 0.17
	Dy ¹⁴⁹				8m	β^+ ; γ 0.39; α 4.21
	Dy ¹⁵¹				18m	EC; γ 0.145; (α 4.06; β^+)
	Dy ¹⁵²		151.9244		2.3h	EC; β^+ ; γ 0.26; (α 3.66)
	Dy ¹⁵³		152.9254		6h	EC; γ 0.08-0.54; (α 3.48)
	Dy ¹⁵⁴		153.9248		10 ⁴ y	α 2.85
	Dy ^{154m}				13h	α 3.35
	Dy ¹⁵⁵				10h	EC; γ 0.065-1.66; (β^+)
	Dy ¹⁵⁶	0.052	155.9238			
	Dy ¹⁵⁷				8.5h	EC; γ 0.33 (others)
	Dy ¹⁵⁸	0.090	157.9240			
	Dy ¹⁵⁹		158.9254		144d	EC; e^- (γ) 0.058, (γ)
	Dy ¹⁶⁰	2.294	159.9248			
	Dy ¹⁶¹	18.88	160.9266	5/2		
Holmium	Dy ¹⁶²	25.53	161.9265			
	Dy ¹⁶³	24.97	162.9284	5/2		
	Dy ¹⁶⁴	28.18	163.9288			
	Dy ¹⁶⁵		164.9317	7/2	2.3h	β^- 1.28, 1.19 (others); γ 0.095 (others 0.043-1.08)
	Dy ^{165m}				1.3m	IT e^- γ 0.106; (β^- ; γ)
	Dy ¹⁶⁶		165.9329	0	82h	β^- 0.40 (others); γ 0.084, 0.054, 0.030 (others)
	Dy ¹⁶⁷				4.4m	β^-
	⁶⁷ Ho ¹⁶¹				36s	EC; α 4.51
	Ho ^{161m}				42s	α 4.60
	Ho ¹⁶²				2.4m	α 4.38
	Ho ^{162m}				52s	α 4.45
	Ho ¹⁶³				9m	EC; (α 3.92)
	Ho ¹⁶⁴				5.6m	EC; α 4.12
	Ho ¹⁶⁵				46m	β^+ 2.1; γ 0.14
	Ho ¹⁶⁶				~1h	EC; γ 0.138

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Erbium	Ho ¹⁵⁸				1.9h	β^+ 1.90, 2.98; γ 0.85
	Ho ¹⁵⁹				33m	EC; γ 0.057-0.309
	Ho ¹⁶⁰				28m	EC; γ 0.73, 0.96, 0.88, 0.65 (others); (β^+)
	Ho ^{160m}				5.3h	IT $e^-(\gamma)$ 0.060
	Ho ¹⁶¹			7/2	2.5h	EC; γ 0.026-0.18
	Ho ¹⁶²		161.9288		12m	β^+ 1.14; EC; $e^-\gamma$ 0.081
	Ho ^{162m}				68m	IT $e^-(\gamma)$ 0.010; $e^-\gamma$ 0.058, 0.038; EC; γ 0.185, 0.081, 1.21
	Ho ¹⁶³		162.9284		> 500y	EC
	Ho ^{163m}				0.8s	IT γe^- 0.30
	Ho ¹⁶⁴		163.9303		37m	β^- 0.99, 0.90; EC; γ 0.037, 0.073, 0.091
	Ho ¹⁶⁵	100	164.9303	7/2		
	Ho ¹⁶⁶		165.9324	0	27h	β^- 1.85, 1.77; γ 0.08 (m) (others)
	Ho ^{166m}		165.9324		> 30y	β^- < 0.10; γ 0.08-1.42
	Ho ¹⁶⁷		166.9331		3.0h	β^- 0.28, 1.0; γ 0.057-0.53
	Ho ¹⁶⁸				3.3m	β^- ~2.2; γ 0.85
	Ho ¹⁷⁰				45s	β^- ~3.1; γ 0.43
	Er ¹⁶²				11s	α 4.93
	Er ¹⁶³				36s	α 4.68
	Er ¹⁶⁴				4.5m	α 4.26
	Er ¹⁶⁵				2.5h	β^+ 1.30; γ 0.098-0.85
	Er ¹⁶⁶				~1h	EC; γ 0.048-0.30
	Er ¹⁶⁷				29h	EC
	Er ¹⁶⁸				3.1h	EC; γ 0.83, 0.21 (others 0.084-1.97)
	Er ¹⁶²	0.136	161.9288			
	Er ¹⁶³				75m	EC; γ 0.43, 1.1
	Er ¹⁶⁴	1.56	163.9293			
	Er ¹⁶⁶			5/2	10h	EC
	Er ¹⁶⁸	33.41	165.9304			
	Er ¹⁶⁷	22.94	166.9320	7/2		
	Er ^{167m}				2.5s	IT γe^- 0.21
	Er ¹⁶⁸	27.07	167.9324			
	Er ¹⁶⁹		168.9347	1/2	9.5d	β^- 0.34; $e^-(\gamma)$ 0.0084
	Er ¹⁷⁰	14.88	169.9355			
	Er ¹⁷¹		170.9382	5/2	7.5h	β^- 1.05 (others); γ 0.308, 0.296, 0.112 (others)
	Er ¹⁷²		171.9396		50h	β^- 0.50, 0.38, 0.29; γ 0.050, 0.41, 0.61 (others)
Thulium	Tm ¹⁶¹				30m	EC; γ 0.084, 0.144, 0.147, 0.17
	Tm ¹⁶²				77m	EC; γ 0.10, 0.24
	Tm ¹⁶³				1.9h	EC; β^+ 1.05, 0.40; γ 0.022- 0.66
	Tm ¹⁶⁴		163.9335		2.0m	EC; β^+ 2.9; γ 0.091 (others)
	Tm ¹⁶⁵				30h	EC; γ 0.25, 0.29, 0.80, 0.34 (others)
	Tm ¹⁶⁶		165.9330	2	7.7h	EC; (β^+ 2.1); γ 0.073-2.10
	Tm ¹⁶⁷			1/2	9.4d	EC; γ 0.057 (m)
	Tm ¹⁶⁸				93d	EC; γ 0.075-1.64; (β^-)
	Tm ¹⁶⁹	100		1/2		
	Tm ¹⁷⁰		169.9359	1	127d	β^- 0.97, 0.88; $e^-\gamma$ 0.084 (m)
	Tm ¹⁷¹		170.9366	1/2	1.9y	β^- 0.10; (γ 0.067)
	Tm ¹⁷²		171.9386		63.6h	β^- 0.28-1.92; γ 0.079 (others 0.18-1.61)
	Tm ¹⁷³				7.3h	β^- 0.9; γ 0.40, 0.47
	Tm ¹⁷⁴				5.5m	β^- 2.5
Ytterbium	Tm ¹⁷⁵				20m	β^- 2.0; γ 0.51
	Tm ¹⁷⁶				1.5m	β^- 4.2
	Yb ¹⁶⁸				1.6s	α 5.21
	Yb ¹⁶⁹				75m	EC
	Yb ¹⁷⁰		169.9333		56h	EC; γ 0.082

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Ytterbium	Yb^{167}				18m	EC; γ 0.026, 0.18
	Yb^{168}	0.135	167.9339			
	Yb^{169}				31d	EC; γ 0.008-0.31
	Yb^{169m}				46s	IT 0.024
	Yb^{170}	3.03	169.9349			
	Yb^{171}	14.31	170.9365	1/2		
	Yb^{172}	21.82	171.9366			
	Yb^{173}	16.13	172.9383	5/2		
	Yb^{174}	31.84	173.9390			
	Yb^{175}		174.9414		4.2d	β^- 0.47, 0.07; γ 0.396 (others)
	Yb^{175m}				0.072s	IT 0.495
	Yb^{176}	12.73	175.9427			
	Yb^{177}		176.9455		1.9h	β^- 1.38 (others); (γ 0.12 1.24)
	Yb^{177m}				6.5s	IT $e^- \gamma$ 0.23; γe^- 0.104
Lutetium	${}_{71}\text{Lu}^{167}$				55m	EC; γ 0.03, 0.40; (β^+)
	Lu^{168}				7.1m	EC; γ 0.087, 0.99, 0.90 (others); (β^+)
	Lu^{169}				2.15h	EC; γ 0.087
	Lu^{169}				1.5d	EC; γ 0.024-1.39
	Lu^{170}		169.9387		2.0d	EC; γ 0.084 (m), 2.04 (others 0.15-3.02)
	Lu^{171}				8.3d	EC; γ 0.020-1.50
	Lu^{172}				67d	EC; γ 0.079-2.08
	Lu^{172m}				3.7m	IT $e^- (\gamma)$ 0.042
	Lu^{173}		172.9390		500d	EC; γ 0.079, 0.101, 0.273 (others)
	Lu^{174}		173.9406		3.6y	EC; γ 0.077, 1.23
	Lu^{174m}				160d	IT $e^- (\gamma)$ 0.059; γ 0.067, 0.045
	Lu^{176}	97.41	174.9409	7/2		
	Lu^{178}	2.59	175.9427	7	3×10^{10} y	β^- 0.43; γ 0.31, 0.20, 0.088 (m)
	Lu^{178m}			1	3.7h	β^- 1.20, 1.10; γ 0.088 (m)
	Lu^{177}		176.9440	7/2	6.8d	β^- 0.50 (others), γ 0.113 (others)
	Lu^{177m}				160d	$\beta^- \sim 1$; γ 0.208, others 0.10- 0.41
	Lu^{178}				22m	β^- ; γ 0.33, 0.43, 0.56, 0.67, 0.78
	Lu^{179}				4.6h	β^- 1.35, 1.08; γ 0.215
	Lu^{180}				2.5m	β^- 3.3
Hafnium	${}_{72}\text{Hf}^{168}$				22m	EC; γ 0.13, 0.17; (β^+)
	Hf^{169}				1.5h	EC; γ 0.049, 0.12; (β^+)
	Hf^{170}				12h	EC
	Hf^{171}				11h	EC; γ 0.12-1.07
	Hf^{172}				~ 5 y	EC; γ 0.024, 0.12, 0.08 (others)
	Hf^{173}				24h	EC; γ 0.12, 0.30 (others)
	Hf^{174}	0.18	173.9403		2×10^{15} y	α 2.50
	Hf^{175}				70d	EC; γ 0.343 (others)
	Hf^{176}	5.20	175.9416			
	Hf^{177}	18.50	176.9435			
	Hf^{178}	27.14	177.9439			
	Hf^{178m}				4s	IT $e^- (\gamma)$ 0.089; γ 0.427, 0.326, 0.214, 0.093 (m)
	Hf^{179}	13.75	178.9460	9/2		
	Hf^{179m}				19s	IT $e^- (\gamma)$ 0.161; γ 0.217
	Hf^{180}	35.24	179.9468			
	Hf^{180m}				5.5h	IT $e^- \gamma$ 0.058; γ 0.44, 0.33, 0.22, 0.093, 0.50
	Hf^{181}		180.94908		45d	β^- 0.41 (others), γ 0.133 (m_2), 0.48 (m_1), 0.35, 0.14 (others)
	Hf^{182}		181.9507		9×10^6 y	β^- ; γ 0.27
	Hf^{183}		182.9538		65m	$\beta^- \sim 1.4$; γ

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Tantalum	Hf^{184}				2.2h	β^-
	$^{73}\text{Ta}^{172}$				24m	EC; β^+
	Ta^{173}				3.7h	EC; γ 0.090, 0.17, (β^+)
	Ta^{174}				1.2h	β^+ ; EC; γ 0.13, 0.21, 0.28, 0.35 (others)
	Ta^{175}				11h	EC; γ 0.050-1.64
	Ta^{176}				8.0h	EC; γ 0.088 (m), 0.20 (others 0.091-2.9)
	Ta^{177}		176.9447		57h	EC; γ 0.113 (others 0.05-1.06)
	Ta^{178}		177.9459		2.2h	EC; γ 0.089-0.43
	Ta^{178}				9.3m	EC; γ 0.093 (others); (β^+)
	Ta^{179}		178.9461		1.6y	EC
	Ta^{180}	0.0123	179.9475			
	Ta^{180m}				8.1h	EC; γ 0.093; β^- 0.60, 0.70; (γ 0.102)
	Ta^{181}	99.9877	180.94798	7/2		
	Ta^{182}		181.95014		115d	β^- 0.18-0.51; γ 0.033-1.61
	Ta^{182m}				16m	IT e^- (γ) 0.184; γ 0.172, 0.147 (others)
	Ta^{183}		182.95144		5.0d	β^- 0.62 (others); γ 0.041-0.406
	Ta^{184}		183.9538		8.7h	β^- 0.15-1.36; γ 0.11-1.2
	Ta^{185}		184.9555		48m	β^- 1.72 (others); γ 0.175, 0.075, 0.100 (others)
	Ta^{186}		185.9583		10.5m	β^- 2.2; γ 0.125-1.1
Tungsten	$^{76}\text{W}^{175}$				80m	EC; γ 1.3, 0.1; (β^+)
	W^{177}				2.2h	EC; γ 0.45, 1.2
	W^{178}				22d	EC; (γ ?)
	W^{179}				40m	EC; γ 0.031
	W^{179m}				7m	IT 0.22
	W^{180}	0.135	179.9470			
	W^{180m}				0.005s	IT 0.24; γ 0.37
	W^{181}		180.9482		126d	EC; e^- (γ) 0.0063 (m); (other γ 's)
	W^{182}	26.41	181.94827			
	W^{183}	14.40	182.95029	1/2		
	W^{183m}				5.3s	IT 0.103; γ 0.11, 0.053, 0.046
	W^{184}	30.64	183.95099			
	W^{185}		184.9535		74d	β^- 0.43, (0.30); (γ 0.125)
	W^{185m}				1.7m	IT e^- γ 0.125; γ 0.175, 0.075, 0.100
	W^{186}	28.41	185.9543			
	W^{187}		186.9574	3/2	24h	β^- 0.63, 1.32, 0.34; γ 0.69, 0.48 (others)
	W^{188}		187.9587		65d	β^- 0.43, 0.34; γ 0.057, 0.15, 0.22, 0.26, 0.29
Rhenium	$^{75}\text{Re}^{177}$				17m	β^+
	Re^{178}				15m	EC; β^+ 3.1
	Re^{179}				20m	EC
	Re^{180}		179.9501		2.4m	EC; (β^+ 1.1); γ 0.88, 0.11
	Re^{180m}				20h	EC; β^+ 1.9
	Re^{181}				20h	EC; γ 0.020-1.54
	Re^{182}				13h	EC; γ 0.032-2.05
	Re^{182}				64h	EC; γ 0.018-1.44
	Re^{183}				68d	EC; γ 0.041-0.407
	Re^{184}				35d	EC; γ 0.111, 0.90, 0.79, 0.89 (others)
	Re^{184m}				165d	EC; (IT 0.217); γ 0.11-0.90
	Re^{185}	37.07	184.9530	5/2		
	Re^{186}		185.9551		89h	β^- 1.07, 0.93; γ 0.137 (others); (EC)
	Re^{187}	62.93	186.9560	5/2	6×10^{10} y	β^- 0.001
	Re^{188}		187.9582		17h	β^- 2.13, 2.0; γ 0.155 (others)
	Re^{188m}				19m	IT e^- (γ) 0.002, 0.016; γ 0.064, 0.106, 0.092

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Osmium	Re ¹⁸⁹				23h	β^- 0.98, others; γ 0.070, 0.15, 0.22, 0.25
	Re ¹⁹⁰		189.9622		2.8m	β^- 1.7; γ 0.19, 0.39, 0.57, 0.83
	Re ¹⁹¹				9.8m	β^- 1.8
	Os ¹⁸¹				23m	EC; γ 0.09, 0.10
	Os ¹⁸²				2.7h	EC; γ 0.23
	Os ¹⁸²				22h	EC; γ 0.510, 0.18, 0.26 (others); [to 13h Re ¹⁸²]
	Os ¹⁸²				13.7h	EC; γ 0.114, 0.382 (m), 0.168 (others)
	Os ^{182m}				0.9h	EC; IT 0.171; γ 1.108, 1.102 (others)
	Os ¹⁸⁴	0.018	183.9526			
	Os ¹⁸⁶		184.9541		94d	EC; γ 0.65, 0.88 (others)
	Os ¹⁸⁶	1.59	185.9539			
	Os ¹⁸⁷	1.64	186.9560	1/2		
	Os ¹⁸⁸	13.3	187.9560			
	Os ^{188m}				26d	IT
	Os ¹⁸⁹	16.1	188.9582	3/2		
	Os ^{189m}				5.7h	IT e^- (γ) 0.031
	Os ¹⁹⁰	26.4	189.9586			
	Os ^{190m}		189.9604		10m	IT e^- (γ) 0.038; γ 0.61, 0.50, 0.36, 0.19
	Os ¹⁹¹		190.9612		14.6d	β^- 0.14; [to 4.8s Ir ^{191m}]
	Os ^{191m}				14h	IT e^- (γ) 0.074
	Os ¹⁹²	41.0	191.9614			
	Os ¹⁹²		192.9645		31h	β^- 1.13 (others); γ 0.129 (others 0.07-0.56)
Iridium	Os ¹⁹⁴				1.9y	β^-
	Os ¹⁹⁵				6.5m	β^- 2
	Ir ¹⁸³				15m	EC; γ 0.13-4.0; (β^+)
	Ir ¹⁸³				55m	EC; γ 0.24, others
	Ir ¹⁸⁴				3.2h	EC; γ 0.125-4.3; (β^+)
	Ir ¹⁸⁵				14h	EC; γ 0.037-1.10
	Ir ¹⁸⁵		185.9580		15.8h	EC; γ 0.071-2.89; (β^+ 1.94)
	Ir ¹⁸⁷				10.5h	EC; γ 0.010-0.99
	Ir ¹⁸⁸		187.9590		41h	EC; γ 0.155, others 0.32-2.22; (β^+ 1.66)
	Ir ¹⁸⁹				12d	EC; γ 0.070, 0.25, others 0.031-0.28
	Ir ¹⁹⁰		189.9608		12.3d	EC; γ 0.187-1.43
	Ir ^{190m}		189.9637		3.2h	EC; β^+ 2.04; [to 10m Os ^{190m}]
	Ir ¹⁹¹	37.3	190.9608	3/2		
	Ir ^{191m}				4.8s	IT e^- (γ) 0.042; e^- γ 0.129, 0.047, 0.082
	Ir ¹⁹²		191.9630		74.0d	β^- 0.67, 0.54, 0.24; γ 0.316, 0.47, 0.30 (others); (EC)
	Ir ^{192m}				1.45m	IT e^- (γ) 0.057; (β^-)
	Ir ^{192m}				6×10^2 y	IT 0.16 [to 74d Ir ¹⁹²]
	Ir ¹⁹³	62.7	192.9633	3/2		
	Ir ^{193m}				12d	IT e^- (γ) 0.080
	Ir ¹⁹⁴		193.9652		19h	β^- 2.24, 1.91 (others); γ 0.328 (others)
Platinum	Ir ^{194m}				0.032s	IT 0.115
	Ir ¹⁹⁵				2.3h	β^- $\sim$ 1; γ 0.10-0.66
	Ir ¹⁹⁷				7m	β^- 1.5, 2.0; γ 0.50
	Ir ¹⁹⁸				50m	β^- 3.6; γ 0.78
	Pt ¹⁸⁵				1.2h	
	Pt ¹⁸⁶				2.9h	EC
	Pt ¹⁸⁷				2.2h	
	Pt ¹⁸⁸		187.9596		10d	EC; γ 0.195, 0.187, 0.055 (others); (α 3.9)
	Pt ¹⁸⁹				11h	EC; γ 0.072-0.80
	Pt ¹⁹⁰	0.0127	189.9599		7×10^{11} y	α 3.11

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Gold	Pt ¹⁹¹				3.0d	EC; γ 0.042-0.62
	Pt ¹⁹²	0.78	191.9614			
	Pt ¹⁹³		192.9633		0.3-500y	EC
	Pt ^{193m}				4.4d	IT e^- (γ) 0.135; e^- (γ) 0.013
	Pt ¹⁹⁴	32.9	193.9628	0		
	Pt ¹⁹⁵	33.8	194.96482	1/2		
	Pt ^{195m}				4.1d	IT e^- (γ) 0.130; e^- γ 0.031, 0.099
	Pt ¹⁹⁶	25.3	195.96498	0		
	Pt ¹⁹⁷		196.96736		20h	β^- 0.67, 0.48; γ 0.077 (m), 0.19
	Pt ^{197m}				1.3h	IT 0.35; (β^- ; γ 0.28)
	Pt ¹⁹⁸	7.21	197.9675			
	Pt ¹⁹⁹		198.9707		30m	β^- 0.8-1.7; γ 0.074-0.96
	Pt ^{199m}				14s	IT γ (e^-) 0.39; e^- (γ) 0.032
	Pt ²⁰⁰				11.5h	β^-
	Pt ²⁰¹				2.3m	β^-
	⁷⁹ Au ¹⁸⁶				7m	EC
	Au ¹⁸⁶				12m	EC; γ 0.16, 0.22, 0.30, 0.40
	Au ¹⁸⁷				8m	EC
	Au ¹⁸⁸				8m	EC; γ 0.25, 0.33, 0.63; (α 5.1)
	Au ¹⁸⁹				30m	EC; γ
	Au ¹⁹⁰				40m	EC; γ 0.29 (others 0.30-3.46)
	Au ¹⁹¹			3/2	3.4h	EC; γ 0.030-2.17
	Au ¹⁹²		191.9649	1	4.1h	EC; β^+ 2.2; γ 0.045-1.16
	Au ¹⁹³			3/2	17h	EC; γ 0.186, 0.112 (others 0.013-0.49)
	Au ^{193m}				3.9s	IT e^- (γ) 0.032; γ 0.26; (EC)
	Au ¹⁹⁴		193.9655	1	39h	EC; γ 0.328, 0.29, 0.62 (others 0.095-2.41); (β^+)
	Au ¹⁹⁵		194.96511	3/2	183d	EC; γ 0.099, 0.031, 0.13
	Au ^{195m}				31s	IT e^- (γ) 0.057; γ 0.20, 0.061, 0.26
	Au ¹⁹⁶		195.96655	2	6.2d	EC; γ 0.356, 0.333 (others); (β^- 0.26)
	Au ^{196m}			12	9.7h	IT e^- (γ) 0.175; γ 0.148, 0.188, 0.085 (m) (others)
	Au ¹⁹⁷	100	196.96655	3/2		
	Au ^{197m}				7.2s	IT e^- (γ) 0.130; γ 0.28
	Au ¹⁹⁸		197.96824	2	2.70d	β^- 0.96 (others); γ 0.412 (others)
	Au ¹⁹⁹		198.96865	3/2	3.15d	β^- 0.30, 0.25; γ 0.158, 0.208
	Au ²⁰⁰		199.9708		48m	β^- 2.2, 0.7; γ 0.37, 1.23
	Au ²⁰¹		200.9719		25m	β^- 1.5; (γ 0.53)
	Au ²⁰²				25s	β^-
	Au ²⁰³				55s	β^- 1.9; γ 0.69
Mercury	⁸⁰ Hg ¹⁸⁵				53s	EC; α 5.64
	Hg ¹⁸⁶				1.5m	EC; γ 0.13, 0.27, 0.35, 0.44
	Hg ¹⁸⁷				3m	EC; α 5.14; γ 0.18, 0.25, 0.40
	Hg ¹⁸⁸				3.7m	EC; γ 0.14
	Hg ¹⁸⁹				9m	EC; γ 0.17, 0.24, 0.32, 0.50
	Hg ¹⁹⁰				20m	EC; γ 0.14, 0.22
	Hg ¹⁹¹				57m	EC; γ 0.25, 0.27
	Hg ¹⁹²				5h	EC; γ 0.031-0.31
	Hg ¹⁹³				6h	EC; γ 0.038-1.08
	Hg ^{193m}				11h	EC; γ 0.032-1.65; IT e^- (γ) 0.101
	Hg ¹⁹⁴		193.9657		146d	EC
	Hg ^{194m}				0.4s	IT; γ 0.134, 0.048
	Hg ¹⁹⁵			1/2	9.5h	EC; γ 0.061-1.17
	Hg ^{195m}			13/2	40h	EC; IT e^- (γ) 0.123; γ 0.016-1.24
	Hg ¹⁹⁶	0.146	195.96582			
	Hg ¹⁹⁷			1/2	65h	EC; γ 0.077 (m), (0.191)
	Hg ^{197m}			13/2	23h	IT e^- (γ) 0.165; γ 0.134; (EC; γ)
	Hg ¹⁹⁸	10.02	197.96877			

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Nuclide		Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Mercury	Hg ¹⁹⁹	16.84	198.96826	1/2		
	Hg ^{199m}		198.96883		44m	IT e^- ; γ 0.370; γ 0.158
	Hg ²⁰⁰	23.13	199.96834			
	Hg ²⁰¹	13.22	200.97031	3/2		
	Hg ²⁰²	29.80	201.97063			
	Hg ²⁰³		202.97285		47d	β^- 0.21; γ 0.279
	Hg ²⁰⁴	6.85	203.97348			
	Hg ²⁰⁵		204.9762		5.5m	β^- 1.65; (γ 0.20)
	Hg ²⁰⁶		205.97747		8.5m	β^- 1.29
Thallium	Tl ¹⁹¹				10m	EC
	Tl ¹⁹²				short	
	Tl ^{192m}				11m	IT 0.11; EC; γ 0.42
	Tl ¹⁹³				23m	EC; γ 0.24, 0.25, 0.26, 0.31 (others)
	Tl ¹⁹⁴				33.0m	EC; γ 0.43
	Tl ^{194m}				32.8m	EC; γ 0.097; IT
	Tl ¹⁹⁵			1/2	1.2h	EC; γ 0.037 (others); β^+ $\sim$ 1.8
	Tl ^{195m}				3.5s	IT e^- (γ 0.009; γ 0.383, 0.393)
	Tl ¹⁹⁶		195.9708		1.8h	EC; γ 0.426; β^+
	Tl ^{196m}		195.9750		1.4h	EC; γ 0.084 (others); (IT)
	Tl ¹⁹⁷			1/2	2.8h	EC; γ 0.152 (others); (β^+)
	Tl ^{197m}				0.54s	IT γe^- 0.222; γ 0.385, 0.387
	Tl ¹⁹⁸		197.9705	2	5.3h	EC; γ 0.412, others 0.19, 2.78; (β^+)
	Tl ^{198m}			7	1.9h	IT 0.261; γ 0.28 (others); EC; γ 0.049, 0.64
	Tl ¹⁹⁹		198.9694	1/2	7.4h	EC; γ 0.158 (<i>m</i>), others 0.037-0.49
	Tl ^{199m}				0.042s	IT 0.37
	Tl ²⁰⁰		199.97097	2	26h	EC; γ 0.065-2.28; (β^+)
	Tl ²⁰¹		200.9708	1/2	73h	EC; γ 0.167 (others)
	Tl ²⁰²		201.9721	2	12d	EC; γ 0.44 (others)
	Tl ²⁰³	29.50	202.97233	1/2		
	Tl ²⁰⁴		203.97389	2	3.80y	β^- 0.76; (EC)
	Tl ²⁰⁵	70.50	204.97446	1/2		
	Tl ²⁰⁶		205.97608		4.3m	β^- 1.57
	Tl ²⁰⁷		206.97745		4.8m	β^- 1.44; (γ)
	Tl ²⁰⁸		207.98201		3.1m	β^- 1.79, 1.28, 1.52; γ 2.61, 0.58, 0.51, 0.86 (others)
	Tl ²⁰⁹		208.98530		2.2m	β^- 2.0; γ 0.12, 0.45, 1.56
	Tl ²¹⁰		209.99000		1.3m	β^- 1.97; γ 0.09-2.45
Lead	Pb ¹⁹⁴				11m	EC; γ 0.20
	Pb ¹⁹⁵				17m	EC; [to 3.5s Tl ^{195m}]
	Pb ¹⁹⁶				37m	EC; γ 0.19-0.50
	Pb ^{197m}				42m	EC [to 0.54s Tl ^{197m}]; IT 0.234; γ 0.085
	Pb ¹⁹⁸				2.4h	EC; γ 0.031-0.87
	Pb ¹⁹⁹				1.5h	EC; γ 0.367, 0.353, 0.72
	Pb ^{199m}				12m	IT e^- ; γ 0.42
	Pb ²⁰⁰				21.5h	EC; γ 0.033-0.61
	Pb ²⁰¹				9.5h	EC; γ 0.33 (others 0.13, 1.40)
	Pb ^{201m}				1.0m	IT γe^- 0.63
	Pb ²⁰²		201.9722		$\sim 3 \times 10^5$ y	EC
	Pb ^{202m}		201.9745		3.6h	IT 0.79, 0.13; γ 0.42, 0.96, 0.66 (others); (EC)
	Pb ²⁰³		202.97321		52h	EC; γ 0.279 (others)
	Pb ^{203m}		202.97410		6.1s	IT γe^- 0.825
	Pb ²⁰⁴	1.48	203.97307			
	Pb ^{204m₁}		203.97542		67m	IT $\gamma(e^-)$ 0.912; γ 0.375 (<i>m</i> ₁), 0.899
	Pb ²⁰⁵		204.97452		3×10^7 y	EC
	Pb ^{205m}		204.97561		0.004s	IT e^- (γ) 0.026; γ 0.99 (others)
	Pb ²⁰⁶	23.6	205.97446	0		
	Pb ²⁰⁷	22.6	206.97590	1/2		
	Pb ^{207m}		206.97765		0.8s	IT γe^- 1.06; γ 0.57

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Bismuth	Pb ²⁰⁸	52.3	207.97664	0		
	Pb ²⁰⁹		208.98111		3.3h	β^- 0.64
	Pb ²¹⁰		209.98418		22y	β^- 0.015, 0.061; e^- (γ) 0.046; (α)
	Pb ²¹¹		210.98880		36.1m	β^- 1.36 (others); (γ) 0.07 1.10
	Pb ²¹²		211.99190		10.6h	β^- 0.34, 0.58; γ 0.239 (others)
	Pb ²¹⁴		213.9998		26.8m	β^- 0.59, 0.65; γ 0.053–0.35
	⁸³ Bi ^{196⁷}				7m	EC; (α 5.83)
	Bi ^{197⁷}				2m	α 6.2
	Bi ¹⁹⁹			9/2	26m	EC; (α 5.47)
	Bi ²⁰⁰			7	35m	EC; γ 0.46, 1.03
	Bi ²⁰¹			9/2	1.85h	EC
	Bi ²⁰¹				62m	EC; (α 5.15)
	Bi ²⁰²			5	1.6h	EC; γ 0.42, 0.96
	Bi ²⁰³		202.9768	9/2	11.8h	EC; γ 0.060–1.90; (β^+ ; α 4.85)
	Bi ²⁰⁴		203.9777	6	11.2h	EC; γ 0.079–2.10
	Bi ²⁰⁵		204.97742	9/2	15.3d	EC; γ 0.026–2.61; (β^+)
	Bi ²⁰⁶		205.9783	6	6.24d	EC; γ 0.11–1.90
	Bi ²⁰⁷		206.97847		30y	EC; γ 0.57, 1.06 (Pb ^{207m}) (others)
	Bi ²⁰⁸		207.97973		$\sim 8 \times 10^5$ y	EC; γ 2.61
	Bi ^{208m}				0.0026s	IT 0.92; γ 0.51
	Bi ²⁰⁹	100	208.98042	9/2		
	Bi ²¹⁰		209.98411	1	5.01d	β^- 1.16; (α)
	Bi ^{210m}				3×10^6 y	α 4.95, 4.92 (others); γ 0.26 (<i>m</i>), 0.30 (<i>m</i>) (others)
	Bi ²¹¹		210.98729		2.15m	α 6.62, 6.28; γ 0.35; (β^-)
	Bi ²¹²		211.99127		60.6m	β^- 2.25 (others); α 6.05 (others); e^- (γ) 0.040 (other γ 's)
	Bi ²¹³		212.99433		47m	β^- 1.39, 0.96; γ 0.44; (α 5.86)
	Bi ²¹⁴		213.99863		19.7m	β^- 1.51, 1.0, 3.18; γ 0.61–2.42; (α)
	Bi ²¹⁵		215.0019		8m	β^-
Polonium	⁸⁴ Po ¹⁹²				0.5s	α 6.58
	Po ¹⁹³				4s	α 6.47
	Po ¹⁹⁴				13s	α 6.38
	Po ¹⁹⁵				30s	α 6.25
	Po ¹⁹⁶				1.8m	α 6.14
	Po ¹⁹⁷				4m	α 6.04
	Po ¹⁹⁸				7m	α 5.93
	Po ¹⁹⁹				12m	α 5.87
	Po ²⁰⁰				11m	EC; (α 5.86, 5.75)
	Po ²⁰¹			3/2	18m	EC; (α 5.57, 5.67, 5.77)
	Po ²⁰²			0	44m	EC; (α 5.57)
	Po ²⁰³			5/2	42m	EC; (α 5.48)
	Po ²⁰⁴			0	3.5h	EC; (α 5.37)
	Po ²⁰⁵			5/2	1.8h	EC; (α 5.23)
	Po ²⁰⁶		205.9805	0	8.8d	EC; γ 0.060–1.32; (α 5.22)
	Po ²⁰⁷		206.98159	5/2	6.0h	EC; γ 0.100–2.06; (β^+ ; α 5.1)
	Po ²⁰⁸		207.98126		2.9y	α 5.11; (EC; γ)
	Po ²⁰⁹		208.98246	1/2	103y	α 4.88; (EC; γ)
	Po ²¹⁰		209.98287	0	138.4d	α 5.305
	Po ²¹¹		210.98665		0.52s	α 7.448 (others); (γ)
	Po ^{211m}		210.98804		25s	α 7.14 (others); γ 1.06, 0.57 (Pb ^{207m})
	Po ²¹²		211.98886		3×10^{-7} s	α 8.78
	Po ^{212m}		211.99201		46s	α 11.7 (others); (γ)
	Po ²¹³		212.99284		4.2×10^{-6} s	α 8.34
	Po ²¹⁴		213.99519		1.6×10^{-4} s	α 7.69
	Po ²¹⁵		214.99947		0.0018s	α 7.37; (β^-)
	Po ²¹⁶		216.00192		0.16s	α 6.78

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
	Po^{217}				< 10 μ	α 6.54
	Po^{218}		218.0089		3.05m	α 6.00; (β^-)
Astatine	$^{85}At^{200?}$				0.9m	α 6.41, 6.46
	At^{201}				1.5m	α 6.35
	At^{202}				3.0m	EC; α 6.13, 6.23
	At^{203}				7.4m	EC; α 6.09
	At^{204}				9.3m	EC; (α 5.95)
	$At^{204?}$				25m	EC
	At^{205}				26m	EC; α 5.90
	At^{206}				30m	EC; (α 5.70; γ)
	$At^{206?}$				2.9h	EC
	At^{207}		206.9857		1.8h	EC; α 5.75
	At^{208}		207.9865		1.8h	EC; γ 0.66, 0.17, 0.25; (α 5.65)
	$At^{208?}$				6.2h	EC
	At^{209}		208.98614		5.5h	EC; γ 0.78, 0.54, 0.20, 0.091; (α 5.64)
	At^{210}		209.9870		8.3h	EC; γ 0.047-1.60; (α)
	At^{211}		210.98750	9/2	7.21h	EC; α 5.86; (γ)
	At^{212}				0.30s	α 7.68, 7.60; γ 0.063
	At^{212m}				0.12s	α 7.82, 7.88; γ 0.063
	At^{213}		212.9931		< 2s	α 9.02
	At^{214}		213.9963		$2 \times 10^{-4}s$	α 8.78
	At^{215}		214.99806		$\sim 10^{-4}s$	α 8.00
	At^{216}		216.00240		$3 \times 10^{-4}s$	α 7.79
	At^{217}		217.00465		0.018s	α 7.05
	At^{218}		218.00855		1.3s	α 6.69 (others)
	At^{219}		219.0114		0.9m	α 6.27; (β^-)
Radon	$^{86}Rn^{204}$				3m	α 6.28
	Rn^{206}				6.5m	α 6.25; EC
	Rn^{207}				11m	EC; (α 6.12)
	Rn^{208}				22m	EC; α 6.14
	Rn^{209}				30m	EC; α 6.04
	Rn^{210}		209.9897		2.7h	α 6.04; EC
	Rn^{211}		210.99060		16h	EC; γ 0.032-1.82; α 5.7 μ (others)
	Rn^{212}		211.99073		25m	α 6.26
	Rn^{213}				0.019s	α 8.13
	Rn^{216}		214.9987		$\sim 10^{-4}s$	α 8.6
	Rn^{216}		216.00023		$4.5 \times 10^{-4}s$	α 8.01
	Rn^{217}		217.00392		$5.4 \times 10^{-4}s$	α 7.68
	Rn^{218}		218.00559		0.019s	α 7.12 (others); (γ)
	Rn^{219}		219.00952		3.92s	α 6.81, 6.55 (others); γ 0.27 (others)
	Rn^{220}		220.01140		54s	α 6.28; (γ)
	Rn^{221}				25m	β^- ; α 6.00
	Rn^{222}		222.0175		3.82d	α 5.49 (others); (γ)
Francium	$^{87}Fr^{208?}$				$\sim 4s$	α 6.83
	Fr^{208}				16s	α 6.74
	Fr^{207}				19s	α 6.74
	Fr^{208}				37s	α 6.59
	Fr^{209}				54s	α 6.62
	Fr^{210}				2.6m	α 6.50
	Fr^{211}				3.1m	α 6.52
	Fr^{212}		211.9961		19m	EC; α 6.39, 6.41, 6.34; γ
	Fr^{213}				34s	α 6.77
	Fr^{214}				0.004s	α 8.55
	Fr^{216}				< 0.001s	α 9.4
	Fr^{217}		217.0048		< 2s	α 8.3
	Fr^{218}		218.0075		0.005s	α 7.85
	Fr^{219}		219.00925		0.02s	α 7.30
	Fr^{220}		220.01233		28s	α 6.69
	Fr^{221}		221.01418		4.8m	α 6.33, 6.11; γ 0.22
	Fr^{222}				15m	β^- ; (α)
	Fr^{223}		223.01980		22m	β^- 1.15; γ 0.049, 0.080 (others) (α 5.34)

TABLE OF NUCLIDES

	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Radium	⁸⁸ Ra ²¹²				18s	α 6.90
	Ra ²¹³				2.7m	α 6.74, 6.61
	Ra ²¹⁴				2.6s	α 7.17
	Ra ²¹⁵				0.0016s	α 8.7
	Ra ²¹⁹		219. 0100		$\sim$ 0.001s	α 8.00
	Ra ²²⁰		220. 01097		0.023s	α 7.45 (others); (γ)
	Ra ²²¹		221. 01386		28s	α 6.61, 6.75, 6.66, 6.57; γ 0.15, 0.18 (others)
	Ra ²²²		222. 01536		38s	α 6.56, 6.23; γ 0.33
	Ra ²²³		223. 01856		11.7d	α 5.71, 5.60 (others); γ 0.031-0.58
	Ra ²²⁴		224. 02022		3.64d	α 5.68 (others); (γ)
	Ra ²²⁵		225. 02352		14.8d	β^- 0.32; γ 0.040
	Ra ²²⁶		226. 0254		1622y	α 4.78 (others); (γ)
	Ra ²²⁷		227. 02922		41m	β^- 1.30 (others); (γ)
	Ra ²²⁸		228. 03123		6.7y	β^- 0.055; (γ ?)
	Ra ²²⁹				$\sim$ 1m	β^-
	Ra ²³⁰				1h	β^- 1.2
Actinium	⁸⁹ Ac ²¹³				$\sim$ 1s	α 7.42
	Ac ²¹⁴				12s	α 7.12, 7.18, 7.24
	Ac ²¹⁵		221. 0157		$< 2s$	α 7.54
	Ac ²²²		222. 0178		4.2s	α 6.96
	Ac ²²³		223. 01912		2.2m	α 6.64; EC
	Ac ²²⁴		224. 0217		2.9h	EC; γ 0.22, 0.13; α 6.17
	Ac ²²⁵		225. 02314		10.0d	α 5.82, 5.78 (others); γ 0.037 (others)
	Ac ²²⁶		226. 0262		29h	β^- 1.17; γ 0.23, 0.16, 0.07; EC; γ 0.25, 0.18
	Ac ²²⁷		227. 02781	3/2	22y	β^- 0.046; (α ; γ)
	Ac ²²⁸		228. 03117		6.13h	β^- 1.11, 0.45, 2.18; γ 0.057-1.64
	Ac ²²⁹				66m	β^-
	Ac ²³⁰				< 1	β^- 2.2
	Ac ²³¹		231. 0386		15n	β^- 2.1; γ 0.085-0.71
Thorium	⁹⁰ Th ²²³		223. 0209		0.9s	α 7.55
	Th ²²⁴		224. 02138		1.1s	α 7.17, 6.9 (others); γ 0.18 (others)
	Th ²²⁵		225. 0237		8.0m	α 6.47 (others); EC; γ
	Th ²²⁶		226. 02489		31m	α 6.33, 6.22; γ 0.11 (others)
	Th ²²⁷		227. 02777		18.2d	α 5.98, 6.04 (others); γ 0.030-0.33
	Th ²²⁸		228. 02675		1.9y	α 5.42, 5.34; e^- (γ) 0.084; (γ)
	Th ²²⁹		229. 03163		7.3×10^4 y	α 4.84, others; γ 0.20, 0.15
	Th ²³⁰		230. 0331		7.5×10^4 y	α 4.88, 4.61; e^- (γ) 0.068, (γ)
	Th ²³¹		231. 03635		25.6h	β^- 0.30, 0.22, 0.14; γ 0.017-0.23
	Th ²³²	100	232. 03821		1.39×10^{10} y	α 4.01, 3.95; e^- (γ) 0.059
	Th ²³³		233. 04143		22.4m	β^- 1.23; (γ)
	Th ²³⁴		234. 0436		24.1d	β^- 0.19, 0.10; γ 0.029, 0.063, 0.091
	Th ²³⁵				< 5 m	β^-
Protactinium	⁹¹ Pa ²²⁴				$\sim$ 0.6s	α 7.75
	Pa ²²⁵				0.8s	α 7.24
	Pa ²²⁶		226. 0274		1.8m	α 6.81
	Pa ²²⁷		227. 02885		38m	α 6.46; EC
	Pa ²²⁸		228. 03100		22h	EC; (α); γ 0.057-1.89
	Pa ²²⁹		229. 03195		1.5d	EC; (α 5.69)
	Pa ²³⁰		230. 03437		17d	EC; β^- 0.41; γ 0.053-0.95; (α ; β^+)
	Pa ²³¹		231. 03594	3/2	3.48×10^4 y	α 5.00, 4.94, 5.02, 4.72 (others); γ 0.027-0.38
	Pa ²³²		232. 03861		1.31d	β^- 0.26, 0.37 (others); γ 0.047-1.15
	Pa ²³³		233. 04011	3/2	27.0d	β^- 0.25, 0.15; γ 0.016-0.42
	Pa ²³⁴		234. 0434		6.7h	β^- 0.14, 0.28 (others); γ 0.043-1.68

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		Per Cent	Nuclidic	Spin	Half-life	Decay Modes,
Nuclide		Abundance	Mass			Radiations, Energies
Pa^{234m}					1.18m	β^- 2.33 (others); (IT 0.021; γ)
Pa^{235}			235.0454		24m	β^- 1.4
Pa^{236}					12m	β^- 3.3
Pa^{237}			237.0510		39m	β^- 2.30, others; γ 0.88, 0.46, 0.92 (others)
Uranium	^{232}U		227.0300		1.3m	α 6.8
	^{233}U		228.03128		9.3m	α 6.68; EC; γ
	^{234}U		229.0332		58m	EC; 6.36, 6.33 (others); γ 0.029 (others)
	^{235}U		230.03393		21d	α 5.88, 5.81; e^- (γ) 0.072; (γ)
	^{236}U		231.0363		4.3d	EC; γ 0.018 0.22; (α 5.45)
	^{237}U		232.03717		74y	α 5.32, 5.26; e^- (γ) 0.058; (γ)
	^{238}U		233.03950	5/2	$1.62 \times 10^4\text{y}$	α 4.82, 4.77 (others); e^- (γ) 0.043; (γ)
	^{234}U	0.0056	234.0409		$2.48 \times 10^5\text{y}$	α 4.77, 4.72 (others); e^- (γ) 0.053; (γ); (SF)
	^{235}U	0.7205	235.04303	7/2	$7.13 \times 10^8\text{y}$	α 4.39 (others); γ 0.18, 0.14, 0.10 (others); (SF)
	^{236m}U				26m	IT e^- (γ) < 0.0001
	^{236}U		236.04573		$2.4 \times 10^7\text{y}$	α 4.50, 4.45; γ 0.05; (SF)
	^{237}U		237.04858		6.75d	β^- 0.25 (others); γ 0.06, 0.21, others 0.027-0.43
	^{238}U	99.274	238.0508		$4.51 \times 10^9\text{y}$	α 4.19 (others); (γ 0.045); (SF)
	^{239}U		239.0543		23.5m	β^- 1.21; γ 0.074
	^{240}U		240.05670		14h	β^- 0.36 (others); γ 0.044
Neptunium	^{231}Np		231.0383		50m	α 6.28
	^{232}Np				13m	EC; γ
	^{233}Np		233.0406		35m	EC; (α 5.53)
	^{234}Np		234.0428		4.4d	EC; γ 0.043-1.61; (β^+)
	^{235}Np		235.04407		410d	EC; (α 5.02; γ)
	^{236m}Np				$> 5 \times 10^3\text{y}$	
	^{236}Np		236.04662		22h	EC; β^- 0.52; e^- γ 0.045
	^{237}Np		237.04803	5/2	$2.20 \times 10^6\text{y}$	α 4.78, 4.76 (others); γ 0.087, 0.019, 0.030 (others)
	^{238}Np		238.0509	2	2.10d	β^- 1.24, 0.26 (others), 0.044-1.03
	^{239}Np		239.05294	5/2	2.35d	β^- 0.33, 0.44 (others); γ 0.013-0.49
	^{240}Np		240.0562		7.3m	β^- 2.18, 1.60, 1.30; γ 0.56, 0.04, 0.80 (others)
	^{240}Np				63m	β^- 0.89; γ 0.085-1.16
	^{241}Np		241.0582		16m	β^- 1.36
	^{241}Np				3.4h	
Plutonium	^{232}Pu		232.0411		36m	EC; α 6.58
	^{233}Pu		233.0427		20m	EC; (α 6.30)
	^{234}Pu		234.0433		9.0h	EC; (α 6.19)
	^{235}Pu		235.0453		26m	EC; (α 5.85)
	^{236}Pu		236.04607		2.85y	α 5.76, 5.72 (others); γ 0.047 (others); (SF)
	^{237}Pu		237.04828		45d	EC; γ 0.033, 0.060 (others); (α)
	^{237m}Pu				0.18s	IT e^- (γ) 0.145
	^{238}Pu		238.0495		86.4y	α 5.49, 5.45 (others); γ 0.044 (others); (SF)
	^{239}Pu		239.05216	1/2	$2.44 \times 10^4\text{y}$	α 5.15, 5.13, 5.10 (others); γ 0.053, 0.013 (others); (SF)
	^{240}Pu		240.05397		6580y	α 5.16, 5.12 (others); γ 0.045 (others); (SF)
	^{241}Pu		241.05671	5/2	13.0y	β^- 0.021; (α ; γ)
	^{242}Pu		242.0587		$3.8 \times 10^4\text{y}$	α 4.90, 4.86; γ 0.045; (SF)
	^{243}Pu		243.0620		5.0h	β^- 0.58, 0.49; γ 0.084, 0.054, 0.012 (others)
	^{244}Pu				$8 \times 10^7\text{y}$	α ; (SF)
	^{245}Pu				10.1h	β^-

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	Nuclide	Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
	Pu ²⁴⁶		246.0702		11d	β^- 0.15, 0.33; γ 0.047, 0.027 (others)
Americium	⁹⁵ Am ²³⁷		237.0498		1.3h	EC; (α 6.01)
	Am ²³⁸				1.86h	EC; γ 0.98, 0.58, 1.35, 0.37 (others)
	Am ²³⁹		239.0530		12.1h	EC; γ 0.225, 0.275; (α 5.77)
	Am ²⁴⁰				51h	EC; γ 1.00, 0.90 (others)
	Am ²⁴¹		241.05669	5/2	458y	α 5.48, 5.43 (others); γ 0.060 (m), 0.017, 0.013
	Am ²⁴²		242.0595	1	16h	β^- 0.63, 0.67; EC; γ 0.042, 0.045
	Am ^{242m}				150y	IT e^- (γ) 0.049; (α ; γ)
	Am ²⁴³		243.06138	5/2	8.0×10^3 y	α 5.27, 5.22 (others); γ 0.075 (others)
	Am ²⁴⁴		244.0645		10.1h	β^- 0.38; γ 0.043-0.74
	Am ^{244m}				26m	β^- 1.5; (EC)
	Am ²⁴⁵		245.06631		2.0h	β^- 0.90; γ 0.036-0.26
	Am ²⁴⁶		246.0698		25m	β^- 1.31, 1.60 (others); γ 0.035-1.06
Curium	⁹⁶ Cm ²³⁸		238.0530		2.5h	EC; α 6.50
	Cm ²³⁹				2.9h	EC; γ 0.19
	Cm ²⁴⁰		240.05550		27d	α 6.26; (SF)
	Cm ²⁴¹		241.0575		35d	EC; γ 0.48 (others); (α 5.95)
	Cm ²⁴²		242.0588	0	162d	α 6.11, 6.07 (others); γ 0.044 (others); (SF)
	Cm ²⁴³		243.06138		32y	α 5.78, 5.74 (others); γ 0.28, 0.23, 0.21 (others); (EC)
	Cm ²⁴⁴		244.06291		18y	α 5.80, 5.76 (others); γ 0.043 (others); (SF)
	Cm ²⁴⁵		245.06534		9.3×10^3 y	α 5.36, 5.45 (others); γ 0.17, 0.13
	Cm ²⁴⁶		246.0674		5.5×10^3 y	α 5.37; (SF)
	Cm ²⁴⁷				1.6×10^3 y	α
	Cm ²⁴⁸				4.7×10^3 y	α 5.05; SF
	Cm ²⁴⁹		249.0758		64m	β^- 0.86
	Cm ²⁵⁰				$\sim 2 \times 10^4$ y	SF
Berkelium	⁹⁷ Bk ²⁴³		243.0629		4.5h	EC; γ 0.84, 0.96, 0.74 (others); (α)
	Bk ²⁴⁴				4.4h	EC; γ 0.90, 0.20 (others); (α)
	Bk ²⁴⁵		245.0662		5.0d	EC; γ 0.25 (others); (α)
	Bk ²⁴⁶				1.8d	EC; γ 0.82 (others)
	Bk ²⁴⁷		247.0702		7×10^3 y	α 5.51, 5.67 (others); γ 0.084, 0.27
	Bk ²⁴⁸		248.0730		16h	β^- 0.65; EC
	Bk ²⁴⁹		249.07484		314d	β^- 0.13; (α ; γ)
	Bk ²⁵⁰		250.0785		3.2h	β^- 0.73, 1.76; γ 0.99, 1.03 (others)
Californium	⁹⁸ Cf ²⁴⁴		244.06593		25m	α 7.17
	Cf ²⁴⁵		245.0679		44m	EC; α 7.11
	Cf ²⁴⁶		246.0688		36h	α 6.75, 6.71 (others); γ 0.042 (others); (SF)
	Cf ²⁴⁷				2.5h	EC; γ 0.32, 0.42, 0.46
	Cf ²⁴⁸		248.07235		350d	α 6.26, 6.22; γ 0.04; (SF)
	Cf ²⁴⁹		249.07470		360y	α 5.81 (others); γ 0.40, 0.34 (others); (SF)
	Cf ²⁵⁰		250.0766		13y	α 6.02, 5.98; γ 0.043; (SF)
	Cf ²⁵¹				~ 800 y	α ; γ 0.18
	Cf ²⁵²				2.55y	α 6.11, 6.07; α 0.042, 0.10; (SF)
	Cf ²⁵³		253.0850		17d	β^- 0.27
	Cf ²⁵⁴				60d	SF
Einsteinium	⁹⁹ Es ²⁴⁵				1.2m	α 7.7
	Es ²⁴⁶				7.3m	α 7.35; EC
	Es ²⁴⁸				25m	EC; (α 6.87)

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Nuclide		Per Cent Abundance	Nuclidic Mass	Spin	Half-life	Decay Modes, Radiations, Energies
Einsteinium	Es^{249}		249.0762		2h	EC; (α 6.76)
	Es^{250}				8h	EC
	Es^{251}		251.0799		1.5d	EC; (α 6.48)
	Es^{252}		252.0829		~ 140 d	α 6.64
	Es^{253}		253.08469		20d	α 6.63 (others); γ 0.09, 0.38, 0.39, 0.43; (SF)
	Es^{254}		254.0881		39h	β^- 0.48, 1.13 (others); γ 0.044, 0.69, 0.65 (others); (EC)
	Es^{255}				250d	α 6.42; γ 0.062 (m)
	Es^{256}				40d	β^-
	Es^{257}				<1h	β^-
Fermium	$^{100}\text{Fm}^{248}$		248.0772		0.6m	α 7.8
	Fm^{249}				2.5m	α 7.9
	Fm^{250}		250.0795		30m	α 7.43; (EC)
	Fm^{251}				7h	EC; (α 6.89)
	Fm^{252}		252.0827		23h	α 7.04 (others); (γ)
	Fm^{253}				5d	EC; α 6.94
	Fm^{254}		254.0870		3.24h	α 7.20, 7.16 (others); γ 0.041 (others); (SF)
	Fm^{255}				19.9h	α 7.03 (others); (γ ; SF)
	Fm^{256}				3.1h	SF
	Fm^{257}				11d	SF
Mendelevium	$^{101}\text{Md}^{255}$		255.0906		~ 30 m	EC; α 7.34
	Md^{256}				~ 1.5 h	EC
	$^{102}\text{Md}^{254}$				3s	α 8.3; SF
Nobelium	$^{102}\text{No}^{254}$				8s	α
	$^{103}\text{No}^{257}$				8s	α 8.6
Lawrencium						
Lw						
103						



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